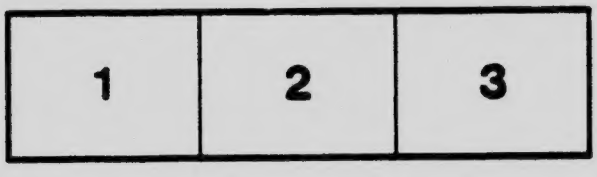

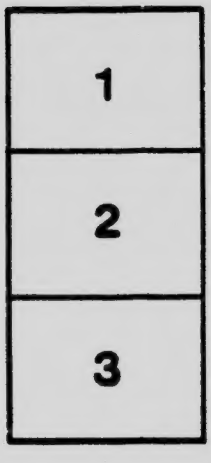

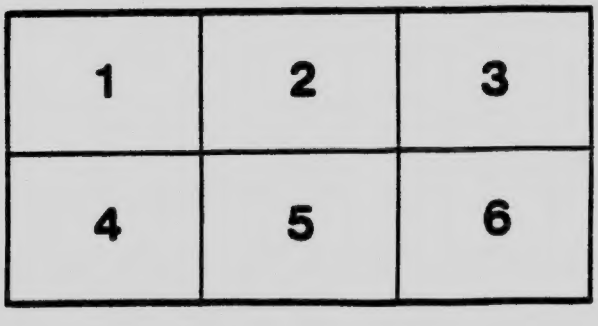

CANADA

DEPARTMENT OF MINES

HON. P. E. BLONDIN, MINISTER; R. G. MCCONNELL, DEPUTY MINISTER

MINES BRANCH

EUGENE HAANEL, PH.D., DIRECTOR.

THE

Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals

IN

CANADA

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1915

Advance Chapter of the Annual Report on the Mineral Production of Canada, 1915

OTTAWA.
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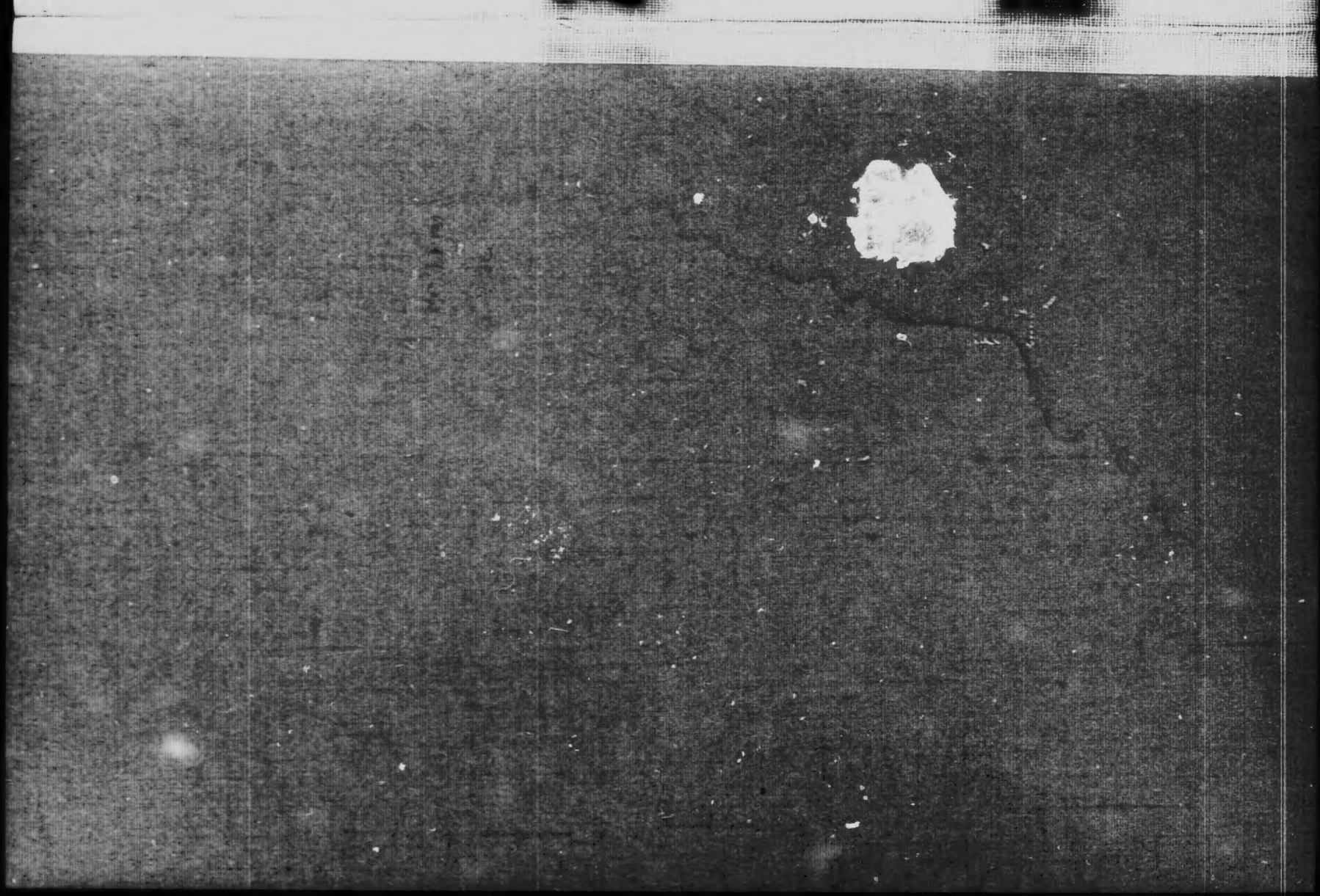

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DR. EUGENE HAANEL,
Director, Mines Branch
Department of Mines, Ottawa

Sir,—The accompanying report on "The production of Copper Gold, Lead, Nickel, Silver, Zinc and other metals in Canada during the Calendar Year 1915," which is submitted for publication as an advance chapter of the Annual Report on the Mineral Production of Canada, 1915, has been compiled under direction by Arthur Buisson, B.Sc., Assistant Mining Engineer in this Division.

I have the honour to be, Sir,
Your obedient servant,
John McLeish.

Division of Mineral Resources and Statistics.
September 12, 1916.

CONTENTS.

ADVANCE CHAPTER OF THE ANNUAL REPORT ON THE MINERAL PRODUCTION OF CANADA, DURING THE CALENDAR YEAR 1915.

(Tons used throughout this report are short tons of 2,000 pounds, except where otherwise stated.)

ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium, is, however, made in extensive works at Shawenegan Falls, Quebec, from bauxite ores imported from France, the United States and also formerly from Germany, by the Northern Aluminium Company. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm.

There being but one firm engaged in the manufacture of aluminium we are precluded from publishing statistics of production.

Imports of alumina, probably including bauxite, and exports of aluminium are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1915, the imports of alumina were 35,016,200 pounds, or 17,508 tons valued at $892,634, as against 28,557,000 pounds, or 14,279 tons, valued at $571,419 in 1914. The imports of aluminium in ingots, bars, etc., were in 1915, 2,667,355 pounds, or 1,334 tons, valued at $633,502, besides manufactures of aluminium valued at $88,733, compared with 3,812,128 pounds, or 1,906 tons of aluminium in ingots, bars, etc., valued at $752,753, and manufactures of aluminium valued at $107,598, in 1914.

The exports of aluminium, ingots, bars, etc., in 1915 amounted to 18,680,800 pounds, valued at $3,333,726, together with manufactures of aluminium valued at $620,562, as against 14,510,800 pounds valued at $2,364,907 and manufactures valued at $5,571 in 1914.

The imports of alumina and exports of aluminium during the past ten years, and the imports of aluminium during the past five years, are shown in tabular form as follows:—

Annual Imports of 'Alumina' and Exports of Aluminium.

Calendar Year.	Imports of alumina.		Exports of aluminium.		
			Ingots, bars, etc.		Manufactures.
	Pounds.	Value.	Pounds.	Value.	Value.
1905	5,360,800	$138,765	2,535,386	$ 508,219	$1,588
1906	8,975,400	239,136	4,521,486	899,113	2,244
1907	12,705,300	268,502	5,478,203	1,109,353	1,499
1908	1,485,500	[illegible]	1,713,800	399,785	1,727
1909	11,794,100	23[illegible]	6,134,500	918,195	3,453
1910	19,464,400	4[illegible]	7,722,400	1,160,242	3,741
1911	18,607,200	3[illegible]	4,990,100	747,587	1,555
1912	22,400,500	448,[illegible]	18,285,700	2,002,363	10,898
1913	30,704,200	614,713	13,015,000	1,762,214	8,203
1914	28,557,080	571,419	14,510,800	2,364,907	5,571
1915	35,016,200	892,634	18,680,800	3,333,726	620,562

Annual Imports of Aluminium.

Year.	Ingots, blooms, bars.		Tubing.		Manufactures.	Total value.
	Pounds.	Value.	Pounds.	Value.		
1910	3,180,250	$ 674,683	10,019	$ 4,203	$ 77,664	$ 756,550
1911	2,527,120	531,273	3,594	1,495	115,278	648,046
1912	2,396,375	410,022	11,624	3,654	120,029	533,705
1913	3,455,686	604,582	19,856	9,174	131,938	745,694
1914	3,796,353	745,855	15,775	6,898	107,598	860,351
1915	2,661,11	630,304	6,238	2,908	88,733	722,235

The price of aluminium in New York remained steady at about 19 cents per pound up to the middle of May, then gradually increased, reaching 60 cents in the latter part of 1915. This was due to the demand being so much in excess of the supply. There was a greatly increased consumption of aluminium in the manufacture of light aluminium alloys and in the manufacture of camping equipment of all kinds, aeroplanes and automobile parts.

The extreme demand in Europe has been attributed in part also to the increase in the use of aminonal, an explosive which is a mixture of nitrate of ammonia and powdered aluminium.

Average Monthly Price of Ingot Aluminium.[1]

(At New York in cents per pound).

	1911.	1912.	1913.	1914.	1915.
January	20·13	19·13	26·31	18·81	19·08
February	21·25	19·44	26·04	18·81	19·22
March	21·15	19·58	27·05	18·50	19·00
April	20·75	20·38	27·03	18·16	18·88
May	20·55	21·69	26·44	17·95	22·03
June	20·03	22·83	24·68	17·75	30·00
July	20·20	23·50	23·38	17·66	32·38
August	20·02	24·38	22·70	19·88	34·50
September	19·34	25·13	21·69	19·94	47·75
October	18·75	26·25	20·13	18·50	50·00
November	18·79	26·56	19·35	18·00	57·75
December	18·85	25·75	18·88	18·96	57·13
	20·07	22·01	23·64	18·63	33·98

[1]As quoted by the Engineering and Mining Journal.

ANTIMONY

Shipments of both antimony ore and concentrates, and of refined antimony were made from Canadian properties during 1915, this being the first recorded production of antimony since 1910. Refined antimony was produced at the smelter of the Consolidated Mining and Smelting Company at Trail, B.C., recovered from the residues of the lead refinery and at the works of Lake George, New Brunswick, of the New Brunswick Metals, Limited, the latter property having been formerly operated by the Canadian Antimony Company. The production was reported as 59,440 pounds and has been valued at 20 cents per pound, or $11,888. The shipments of antimony ore or concentrates, reported as 1,341 tons containing approximately 1,050,196 pounds of antimony and valued at $81,283 were derived principally from the mines of the West Gore Antimony Company, at West Gore, Hants county, Nova Scotia. There were also small experimental shipments from the Alps-Alturas claims, Slocan Mining Division, owned by W. J. McMillan & Co., Vancouver, B.C., and from the Chinook Mountain group, Kiokook creek, near Kanaka, B.C., owned by W. S. Clark, Keefers, B.C., and a small shipment from Tagish lake, Yukon.

The annual production of antimony ore with the exports of antimony ore and imports of antimony are given in the following tables:—

Annual Shipments of Antimony Ore.

Year.	Tons.	Value.	Year.	Tons.	Value.
1886	665	$31,490	1905 (a)	327	
1887	584	10,860	1906 (a)	782	
1888	345	3,696	1907	2,016	$ 65,000
1889	55	1,100	*Refined antimony		5,108
1890	26½	625	1908 (b)	148	5,443
1891	10	60	1909	35	1,575
1892 to 1897			*Refined antimony		4,285
1898	1,344	20,000	1910	364	13,906
1899 to 1904			1911–1914		
			1915	1,341	81,283
			*Refined antimony		11,888

(a) As recorded by the Nova Scotia Department of Mines; no value given.
(b) Exports.
*Refined antimony; 63,850 pounds in 1907, 61,207 pounds in 1909, and 59,440 pounds in 1915.

Exports of Antimony Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1880	40	$ 1,948	1890	38	$ 1,000	1905	525	$ 27,118
1881	34	3,308	1891	3½	60	1906	420	17,064
1882	323	11,673	1892–1897			1907	1,327	37,807
1883	165	4,200	1898	1,232	15,295	1908	148	5,443
1884	483	17,875	1899	6½	190	1909	4	120
1885	758	36,250	1900	210	3,441	1910	239	14,095
1886	665	31,490	1901	10	1,643	1911	57	4,946
1887	229	9,720	1902	90	13,658	1912–1914		
1888	352½	6,894	1903	33	4,332	1915	1,149	82,990
1889	30	695	1904	160	7,237			

Imports of Antimony.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.	42,247	$ 5,903	1892.	180,308	$ 17,680	1904.	418,943	$ 27,11
1881.	.....	7,060	1893.	181,823	14,771	1905.	186,454	12,82
1882.	183,597	15,044	1894.	139,571	12,249	1906	403,918	56,29
1883.	105,346	10,355	1895.	79,707	6,131	Calendar year.		
1884.	445,600	15,564	1896.	163,209	9,557	1907	534,104	88,53
1885.	82,012	8,182	1897.	134,661	8,031	1908.	426,736	30,96
1886.	89,787	6,951	1898.	156,451	12,350	1909.	591,530	41,73
1887.	87,827	7,122	1899.	289,066	16,851	1910.	483,282	34,44
1888.	120,125	12,242	1900.	186,997	20,001	1911.	579,466	38,82
1889.	119,034	11,206	1901.	350,737	24,714	1912.	1,053,728	67,65
1890.	117,066	17,439	1902.	504,822	30,276	1913.	690,699	51,82
1891.	114,084	17,483	1903.	868,146	65,434	1914.	694,150	57,71
						1915	2,030,150	355,23

1915	Antimony, or regulus of, not ground, pulverized or otherwise manufactured	Duty free.	1,962,194	$344,918
	Antimony salts		67,956	10,320
	Total...		2,030,150	$355,238

The average prices of antimony, as quoted by the "Engineering and Mining Journal," are shown in the following table:—

Average Prices of Antimony.

	1913.			1914.			1915.		
	Cookson's	U.S.[1]	Ordinaries.[2]	Cookson's	U.S.[1]	Ordinaries.	Cookson's	U.S.[1]	Ordinaries.[2]
January.	9·94	9·53	8·97	7·388	7·110	6·125	17·90	.....	15·85
February.	9·47	9·09	8·25	7·250	7·057	6·100	21·25	.....	18·21
March...	9·28	8·85	8·18	7·315	7·073	6·053	28·75	.....	22·13
April...	9·13	8·50	7·98	7·363	7·048	6·006	31·88	.....	24·88
May.	8·88	8·37	7·79	7·365	7·020	5·845	42·70	.....	35·30
June.	8·79	8·27	7·64	7·250	7·000	5·825	47·50	.....	37·69
July.	8·54	8·08	7·55	7·210	6·940	5·638	50·44	.....	38·13
August.	8·38	7·91	7·39	17·250	15·800	13·800	48·00	.....	33·00
September	8·37	7·93	7·37	11·830	.....	9·940	44·56	.....	28·63
October..	7·60	7·27	6·49	14·680	.....	12·060	45·50	.....	31·45
November.	7·62	7·30	6·45	17·750	.....	14·450	47·25	.....	38·88
December.	7·50	7·25	6·13	16·130	.....	13·310	55·00	.....	39·25
	8·73	8·22	7·52	10·732	.....	8·763	40·06	.....	30·28

[1] United States brands.
[2] Hungarian, Chinese, or other "Foreign" brands.

The price of antimony, ordinary grades, in New York ranged between a minimum of 13 cents in January to a maximum of 42 cents in December, averaging 30·28 cents for the year.

The price of "Cooksons" in December was 55 cents per pound and the year's average 40·06 cents.

COBALT.

The silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, in the Province of Ontario, are now the principal sources of the world's production of cobalt.

The recovery of this metal in Canada has been in the form of cobalt-oxide and mixed oxides of cobalt and nickel, produced by the smelters treating the above ores, together with cobalt residues produced at the high grade mill of the Nipissing Mining Company. Formerly these residues have been chiefly exported but they are now being shipped mainly to Canadian smelters.

In addition to the oxide of cobalt, there is now being recovered metallic cobalt, cobalt sulphate and stellite, the cobalt alloy used for high speed tool metal.

According to returns received there were produced in 1915, 211,610 pounds of metallic cobalt, valued at $197,995, and 423,717 pounds of cobalt oxide, valued at $338,273 (including a small production of cobalt sulphate).

Assuming the cobalt-oxide to average 70 per cent cobalt, the total production of the metal would approximate 504,212 pounds in 1915.

The actual shipments during 1915 were much less than the recoveries, considerable stocks being carried at the end of the year.

During 1914 there was recovered 899,027 pounds of cobalt-oxide, valued at $571,710, while the production of mixed oxides of cobalt and nickel, together with the shipments abroad of cobalt residues, amounted to 2,079,001 pounds, valued at $79,995, and containing 242,572 pounds of metallic cobalt. Assuming the cobalt-oxide to average 70 per cent cobalt the total production of the metal would approximate 871,891 pounds in 1914.

No record is available as to the recovery of cobalt from silver ores exported but it is stated that cobalt speiss has been accumulated at United States smelters treating these ores.[1]

The production of cobalt-oxide, nickel-oxide and cobalt material during the past four years has been as follows:—

Production of Cobalt and Nickel-Oxides.

Year.	Cobalt oxide.		Nickel oxide.		Mixed oxides of cobalt and nickel and other cobalt material.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1912	257,677	$128,843	91,377	$ 9,137	1,285,280	$163,988
1913	660,079	525,028	268,304	30,122	3,216,000	90,266
1914	899,027	571,710	392,512	34,883	2,079,001	79,996
1915	423,717	338,273	282,025	31,262	.....	.....

[1] Mineral Resources of the United States, 1913, p. 340.

The market for cobalt in 1915 was very poor. Prior to the war t principal demand was for colouring in the ceramic industry.

A small demand for cobalt me' ! now exists for use in making ste for high speed tools and for plating purposes. The market will like strengthen as soon as conditions in Europe become normal.

The results of researches on cobalt and cobalt alloys, undertaken f the Mines Branch, by Dr. H. T. Kalmus, at Queens University, have bee published in five parts.[1]

Under the provision of the "Metal Refining Bounty Act," passe by the Ontario Legislature in 1907, bounties amounting to $26,744.7 were paid to refineries on cobalt-oxide, and $10,280.28 on nickel-oxid in 1914.

The bounty is at the rate of six cents per pound on the metallic con tents of the oxides. The "Act" which expires in April, 1917, was quote in the Annual Report on Mineral Production of Canada, during the Calen dar Year 1914, and previous reports of this Division.

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[1]Mines Branch No. 259, "Preparation of Metallic Cobalt by Reduction of the Oxide." Report on, b H. T. Kalmus, B.Sc., Ph.D.

Mines Branch No. 334, "Electro-plating with Cobalt." Report by H. T. Kalmus, B.Sc., Ph.D., 191

Mines Branch No. 309, "The Physica' Properties of the Metal Cobalt." Report on, by H. T. Kalmus B.Sc., Ph.D.

Mines Branch No. 411, "Cobalt Alloys with Non-Corrosive Properties." Report on, by H. T. Kalmus B.Sc., Ph.D.

Mines Branch No. 413, "Magnetic Properties of Cobalt and of FeCo." Report on, by H. T. Kalmus B.Sc., Ph.D.

COPPER.

The total production of copper in Canada in 1915 estimated on the basis of smelter recovery from ores treated, was 100,785,150 pounds, which, at the average price of copper for the year in New York, 17·275 cents per pound, would be worth $17,410,635, as against 75,735,960 pounds, valued at $10,301,606 in 1914; that is, an increase of about 25 per cent in quantity and 41 per cent in value.

Since 1912 there had been a gradual falling off in quantity, and owing to the decrease in the price of the metal, a still greater falling off in value, but, due to the great demand for copper for munitions, the production in 1915 exceeded, both in quantity and value, that of any preceding year.

Statistics showing the annual copper production in Canada since 1886 are given in the following table, which shows the yearly increase or decrease as the case may be and also the yearly price per pound in New York:—

Annual Production of Copper.

Year.	Pounds.	Increase or Decrease.		Value.	Increase or Decrease.		Cents per pound.
		Pounds.	%		Value.	%	
1886	3,505,000			$ 385,550			11·00
1887	3,260,424	(d) 244,576	6·99	366,798	(d) $ 18,752	4·86	11·25
1888	5,562,864	2,302,440	70·60	927,107*	560,309	152·70	16·66
1889	6,809,752	1,246,888	22·40	936,341	9,234	0·99	13·75
1890	6,013,671	(d) 796,081	11·69	947,153	10,812	1·15	15·75
1891	9,529,401	3,515,730	58·46	1,226,703	279,550	29·51	12·87
1892	7,087,275	2,442,126	25·63	818,580	(d) 408,123	33·27	11·55
1893	8,109,856	1,022,381	14·40	871,809	53,229	6·50	10·75
1894	7,708,789	(d) 401,067	4·94	736,960	(d) 134,849	15·46	9·56
1895	7,771,639	62,850	0·81	836,228	99,268	13·47	10·76
1896	9,393,012	1,621,373	20·86	1,021,960	185,732	22·21	10·88
1897	13,300,802	3,907,790	41·60	1,501,660	479,700	46·94	11·29
1898	17,747,136	4,446,334	33·43	2,134,980	633,320	42·17	12·03
1899	15,078,475	(d) 2,668,661	15·04	2,655,319	520,339	24·37	17·61
1900	18,937,138	3,858,663	25·59	3,065,922	410,603	15·46	16·19
1901	37,827,019	18,889,881	99·75	6,096,581	3,030,659	98·84	16·117
1902	38,804,259	977,240	2·58	4,511,383	(d) 1,585,198	26·00	11·626
1903	42,684,454	3,880,195	10·00	5,649,487	1,138,104	25·23	13·235
1904	41,383,722	(d) 1,300,732	3·05	5,306,635	(d) 342,852	6·07	12·823
1905	48,092,753	6,709,031	16·21	7,497,660	2,191,025	41·29	15·590
1906	55,609,888	7,517,135	15·63	10,720,474	3,222,814	42·98	19·278
1907	56,979,205	1,369,317	2·46	11,398,120	677,654	6·32	20·004
1908	63,702,873	6,723,668	11·80	8,413,876	2,984,244	26·18	13·208
1909*	52,493,863			6,814,754			12·982
1910	55,692,369	3,198,506	6·09	7,094,094	279,340	4·10	12·738
1911	55,648,011	(d) 44,358	0·79	6,886,998	(d) 207,096	2·92	12·376
1912	77,832,127	22,184,116	28·50	12,718,548	5,831,550	45·85	16,341
1913	76,976,925	(d) 855,202	1·10	11,753,606	(d) 964,942	7·59	15·269
1914	75,735,960	(d) 1,240,965	1,64	10,301,606	(d) 1,452,000	14·10	13·602
1915	100,785,150	25,049,190	24·85	17,410,635	7,109,029	40·83	17·275

*The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years.

The production of copper in Canada in 1915 included 44,597 pounds recovered in copper sulphate; 42,050,347 pounds contained in blister

copper exported for refining; 44,185,455 pounds contained in matte, chiefly nickel-copper matte, exported for refining, and 14,504,751 pounds in ore, after allowing for smelter losses, exported for smelting and refining.

The total production in 1914 included: 38,508 pounds recovered in copper sulphate; 25,554,911 pounds in blister copper exported for refining; 32,782,973 pounds in "matte" exported for refining; and 17,359,568 pounds in ore, after allowing for smelter losses, also exported for smelting and refining.

The Province of British Columbia in 1915 contributed 56·2 per cent of the total production, as against 54·4 per cent in 1914. Ontario contributed in 1915 over 39 per cent of the total as against 38·2 per cent in 1914, and Quebec 4·1 per cent in 1915, as compared with 5·5 per cent in 1914.

Production of Copper by Provinces, 1913, 1914, and 1915.

Provinces.	1913.		1914.		1915.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Quebec	3,455,887	$ 527,679	4,201,497	$ 571,488	4,197,482	$ 725,115
Ontario	25,885,929	3,952,522	28,948,211	3,937,536	39,361,404	6,799,693
British Columbia	45,791,579	6,991,916	41,219,202	5,606,636	56,692,988	9,793,714
Other districts	*1,843,530	281,489	†1,367,050	185,946	† 533,216	92,113
Total	76,976,925	11,753,606	75,735,960	10,301,606	100,785,150	17,410,635

*Includes Nova Scotia and Yukon. †Yukon only.

Prices.—The price of copper in New York, which was quoted at about 12·70 cents in the first days of 1915, rose steadily to 20 cents in the middle of June, it then decreased gradually to 15·75 cents in the last week in August, to again increase and reach a maximum of 22¼ cents in the last week in December.

The monthly average prices in New York and London are given in the following tables:—

Monthly Average Prices of Electrolytic Copper in New York.

(In cents per pound.)

Months.	1911.	1912.	1913.	1914.	1915.
January	12·295	14·094	16·488	14·223	13·641
February	12·256	14·084	14·971	14·491	14·394
March	12·139	14·698	14·713	14·131	14·787
April	12·019	15·741	15·291	14·211	16·811
May	11·989	16·031	15·436	13·996	18·506
June	12·385	17·234	14·672	13·603	19·477
July	12·463	17·190	14·190	13·223	18·796
August	12·405	17·498	15·400	*	16·941
September	12·201	17·508	16·328	*	17·502
October	12·189	17·314	16·337	*	17·686
November	12·616	17·326	15·182	11·739	18·627
December	13·552	17·376	14·224	12·801	20·133
Yearly average	12·376	16·341	15·269	13·602	17·275

*No quotations.

Monthly Average Prices of Standard Copper in London.

(In £ Sterling per ton of 2,240 pounds.)

Months	1911.	1912.	1913.	1914.	1915.
January	55·604	62·760	71·741	64·304	60·756
February	54·970	62·893	65·519	65·259	63·494
March	54·704	65·884	65·329	64·276	66·152
April	54·035	70·294	66·111	64·747	75·096
May	54·313	72·352	68·807	63·182	77·600
June	56·368	78·259	67·140	61·336	82·574
July	56·670	76·636	64·166	60·540	76·011
August	56·264	78·670	69·200	*	68·674
September	55·253	78·762	73·125	*	68·915
October	55·176	76·389	73·363	*	72·601
November	57·253	76·800	68·275	53·227	77·744
December	62·063	75·416	65·223	56·841	80·771
Yearly average	55·973	73·942	68·535	61·524	72·532

*No quotations.

Exports and Imports.—With the exception of a small output of copper sulphate at Trail, B.C., the copper production of Canada is exported for refining. The exports of copper in ore, matte, regulus, etc., during the calendar year 1915 were 81,437,063 pounds, valued at $8,671,641, of which 81·24 per cent in quantity and 86·66 per cent in value were exported to the United States, and 18·76 per cent in quantity and 13·34 per cent in value to Great Britain.

The exports of copper black or coarse and in pigs, were to the United States and amounted to 21,292,516 pounds, valued at $3,788,715.

There was also an export of "old and scrap" copper amounting to 4,161,600 pounds and valued at $616,553, distributed as follows: 95·08 per cent in quantity and 95·23 per cent in value to the United States, and 4·92 per cent in quantity and 4·77 per cent in value to Great Britain.

The total exports of copper in 1915, including "old and scrap" were 106,891,179 pounds valued at $13,076,909, an increase of 38·10 per cent in quantity and 58·11 per cent in value over the exports in 1914.

Exports of Copper 1914 and 1915.

Destination.	Fine ore, matte, regulus, etc.		Black or coarse and in pigs.		'Old and Scrap.'	
1915.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value
United States	66,155,803	$7,514,736	21,292,516	$3,788,715	3,956,600	$ 587,153
Great Britain	15,281,260	1,156,905			205,000	29,400
Other countries						
	81,437,063	$8,671,641	21,292,516	$3,788,715	4,161,600	$ 616,553
1914.						
United States	57,923,363	$6,287,439	6,581,564	$908,201	1,660,400	$189,793
Great Britain	10,906,696	843,339			275,100	35,918
Other countries					51,600	5,999
	68,830,059	$7,130,778	6,581,564	$ 908,201	1,987,100	$231,710

Exports of Copper in Ore, Matte, etc., from 1885 to 1915.

Calendar Year.	Pounds.	Value.	Calendar Year.	Pounds.	Value.
1885		$ 262,600	1901	32,488,872	$3,404,908
1886		249,259	1902	26,094,498	2,476,516
1887		137,966	1903	38,364,676	3,873,827
1888		257,260	1904	38,553,282	4,216,214
1889		168,457	1905	40,740,861	5,443,873
1890		398,497	1906	42,398,538	7,303,366
1891		348,104	1907	54,688,450	8,749,609
1892		277,632	1908	51,136,371	5,934,559
1893	4,792,201	269,160	1909	54,447,750	5,832,246
1894	1,625,389	91,917	1910	56,964,127	5,840,553
1895	3,742,352	236,965	1911	55,287,710	5,467,725
1896	5,462,052	281,070	1912	78,488,564	9,036,479
1897	14,022,610	850,336	1913*	85,147,560	9,927,814
1898	11,572,381	840,243	1914*	77,398,723	8,270,689
1899	11,371,766	1,199,908	1915*	106,891,179	13,076,909
1900	23,631,523	1,741,885			

*Includes "Old and Scrap."

The total imports of copper during the calendar year 1915 were valued at $3,957,770 and included: crude and manufactured copper 20,245,407 pounds, valued at $3,593,818; copper sulphate 1,854,850 pounds, valued at $99,282; and the manufactures of copper, valued at $264,670.

The following tables of imports show a decrease of about $300,000, as compared with 1914 and the imports of 1915 are only about 53 per cent of those in 1913.

Imports of Copper 1914 and 1915.

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
Copper, old and scrap	127,800	$ 15,717	68,500	$ 8,281
Copper in pigs, ingots or in blocks	3,733,300	507,499	4,771,200	777,533
Copper in bars, and rods, in coils, or otherwise, in lengths, not less than 6 feet, unmanufactured	18,212,300	2,689,940	11,989,400	2,082,182
Copper, in strips, sheets or plates, not planished or coated, etc	3,373,100	574,783	2,668,400	534,926
Copper tubing in lengths not less than 6 feet and not polished, bent or otherwise manufactured	696,444	159,602	670,337	173,896
Copper rollers, for use in calico printing		22,301		2,777
Copper and manufactures of:—				
Nails, tacks, rivets and burrs or washers		4,445		8,661
Wire, plain, tinned or plated	137,871	35,781	77,383	16,965
Wire cloth, etc		4,433		1,308
All other manufactures of, n.o.p.		188,270		251,924
Copper, precipitate of, crude	2,017	328	187	35
Copper sulphate	1,143,039	53,802	1,854,850	99,282
Total value		4,256,901		3,957,770

Imports of Copper 1907 to 1915 inclusive.

Year.	Pigs, ingots or in blocks.		Manufactures of copper.									Total value.
			Old and scrap.		Bars, rods, sheets, tube and wire.		Other manufactures.	Crude precipitate.		Copper sulphate.		
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Value.	Pounds.	Value.	Pounds.	Value.	
1907	3,456,900	$699,388	196,300	$ 37,787	13,499,130	$ 3,138,283	$108,057	7,397	$1,340	2,299,674	$142,948	$4,127,803
1908	2,360,900	353,301	127,700	12,821	12,150,850	1,765,415	88,715	4,209	557	2,768,123	131,057	2,351,866
1909	4,200,100	554,273	132,600	14,447	16,208,978	2,340,464	126,769	1,990	257	1,634,751	66,459	3,102,669
1910	4,640,500	609,111	273,700	31,070	25,322,906	3,579,270	150,322	4,847	595	1,925,557	77,782	4,448,150
1911	5,650,400	705,598	265,300	28,748	29,244,210	3,898,416	215,289	2,608	299	2,191,899	88,419	4,936,769
1912	5,121,800	806,705	400,500	56,748	35,198,208	5,776,003	305,680	5,703	570	2,105,419	101,650	7,047,356
1913	5,314,200	845,095	596,700	87,790	35,101,061	6,002,937	370,313	4,743	515	2,037,714	107,960	7,414,610
1914	3,733,300	507,499	127,800	15,717	22,419,715	3,460,106	219,449	2,017	328	1,143,039	53,802	4,256,901
1915	4,771,200	777,533	68,500	8,281	15,405,520	2,807,969	264,670	187	35	1,854,850	99,282	3,957,770

Copper: Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880	31,900	$ 2,130	1898	1,050,000	$ 80,000
1881	9,800	1,157	1899	1,655,000	246,740
1882	20,200	1,984	1900	1,144,000	180,990
1883	124,500	20,273	1901	951,500	152,274
1884	40,200	3,180	1902	1,767,200	325,832
1885	28,600	2,016	1903	2,038,400	252,594
1886	82,000	6,969	1904	2,115,300	270,315
1887	40,100	2,507	1905	1,944,400	266,548
1888	32,300	2,322	1906	2,627,700	441,854
1889	32,300	3,288	Calendar Year.		
1890	112,200	11,521	1907	3,653,200	737,175
1891	107,800	10,452	1908	2,488,600	366,122
1892	313,600	14,894	1909	4,332,700	568,720
1893	168,300	16,331	1910	4,914,200	640,181
1894	101,200	7,397	1911	5,915,700	734,346
1895	72,062	6,770	1912	5,522,300	863,453
1896	86,905	9,226	1913	5,910,900	932,885
1897	49,000	5,449	1914	3,861,100	523,216
			1915	4,839,700	785,814

Imports of Manufactures of Copper.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880	$123,061	1892	$422,870	1904	$1,191,610
1881	159,163	1893	458,715	1905	1,775,881
1882	220,235	1894	175,404	1906	2,660,303
1883	247,141	1895	251,615	Calendar Year	
1884	134,534	1896	285,220	1907	3,246,340
1885	181,469	1897	264,587	1908	1,854,130
1886	219,420	1898	786,529	1909	2,467,233
1887	325,365	1899	551,586	1910	3,729,592
1888	303,459	1900	1,090,280	1911	4,113,705
1889	402,216	1901	951,045	1912	6,081,683
1890	472,668	1902	1,281,522	1913	6,373,250
1891	563,522	1903	1,291,635	1914	3,670,555
				1915	3,072,639

There is also an importation of copper in the form of brass. The imports of brass in 1915 included 3,810,948 pounds of metal in crude and manufactured form (see Chapter on Zinc) containing possibly 2,667,663 pounds of copper, valued at $714,410, and also manufactures of brass, quantity not recorded, valued at $2,463,532.

Consumption of Copper.—In view of the large import of manufactured copper and brass for which no quantity is recorded, it is difficult to estimate closely the consumption of copper. It is apparent, however, that the consumption in 1915 exceeded 23,000,000 pounds, while it is probable that the metal contained in other manufactures of copper and brass was not more than 5,000,000 pounds. The consumption in 1913 exceeded 44,000,000 pounds.

Quebec.

The mines in the Eastern Townships were still more active in 1915 than in the past years, and the slight decrease in production is attributed to the destruction by fire of the power plant and concentrator of the Eustis Mining Company.

The production amounted to 4,197,482 pounds, valued at $725,115, representing the estimated recovery from 139,865 tons of ore and concentrates.

Statistics of the copper production of Quebec province since 1886 are shown in the following table:—

Quebec: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1886	3,340,000	$ 367,400	1896	2,407,200	$ 261,903	1906	1,981,169	$ 381,930
1887	2,937,900	330,514	1897	2,474,970	279,424	1907	1,517,990	303,659
1888	5,562,864	927,107	1898	2,100,235	252,658	1908	1,282,024	169,330
1889	5,315,000	730,813	1899	1,632,560	287,494	1909	1,088,212	141,272
1890	4,710,606	741,920	1900	2,220,000	359,418	1910	877,347	111,757
1891	5,401,704	695,469	1901	1,527,442	246,178	1911	2,436,190	301,503
1892	4,883,480	564,042	1902	1,640,000	190,666	1912	3,282,210	536,346
1893	4,468,352	480,348	1903	1,152,000	152,467	1913	3,455,887	527,679
1894	2,176,430	208,067	1904	760,000	97,455	1914	4,201,497	571,488
1895	2,242,462	241,288	1905	1,621,243	252,752	1915	4,197,482	725,115

Ontario.

The copper production from Ontario comes mainly from the nickel-copper ores of Sudbury district.

The chief companies are: The Canadian Copper Co., Limited, shipping from the Creighton, Crean Hill, the No. 2, the No. 3, or Frood, and the Vermillion mines; and the Mond Nickel Co., Ltd., operating the Garson, Victoria, Frood Extension, Levack, Worthington and Kirkwood mines.

The Alexo Mining Co., operating near Porquis Junction on the T. & N.O. Railway, shipped a considerable tonnage of nickel-copper to the Mond Nickel Company's smelter at Coniston. The Sudbury Leasing and Development Company, of Sudbury, also was an important shipper to Coniston.

The British America Nickel Corporation did not operate any of its properties during 1915.

A few small shipments of copper ore were made from the following: Price-Brewer mine, near Latchford—the Bruce mine, near Bruce Mines, Algoma—and the property of the Sable River Copper Co., near Massey. There is also a small recovery of copper from Cobalt District silver ores sent to United States smelters.

The copper production from Ontario in 1915 amounted to 39,361,464 pounds, valued at $6,799,693, *i.e.*, 39 per cent of the production of Canada.

The total tonnage of nickel-copper ores smelted in 1915 was 1,272,283 tons. There were produced during the year 67,703 tons of bessemer matte, containing 19,608 tons of copper and 34,039 tons of nickel, the shipping value of the matte being reported as $10,352,344. Details of the production of these ores are given more completely and in tabular form in the article on "Nickel."

The Ontario Government offers a bounty on copper over 95 per cent pure metal, and on copper-sulphate produced from ore mined and refined in the Province. The text of the Act was quoted in the Annual Report on Mineral Production of Canada, 1914, p. 60.

Statistics of the copper production of Ontario since 1886 are given in the table following:—

Ontario: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1886	165,000	$ 18,150	1896	3,167,255	$ 344,598	1906	10,638,231	$2,050,838
1887	322,524	36,284	1897	5,500,652	621,023	1907	14,104,337	2,821,432
1888	Nil.	Nil.	1898	8,375,223	1,007,559	1908	15,005,171	1,981,883
1889	1,466,752	201,678	1899	5,723,324	1,007,877	1909	15,746,699	2,044,237
1890	1,303,065	205,233	1900	6,740,058	1,091,215	1910	19,259,016	2,453,213
1891	4,127,697	531,234	1901	8,695,831	1,401,507	1911	17,932,263	2,219,297
1892	2,203,795	254,538	1902	7,408,202	861,278	1912	22,250,601	3,635,971
1893	3,641,504	391,461	1903	7,172,533	949,285	1913	25,885,929	3,952,522
1894	5,207,679	437,854	1904	4,913,594	630,070	1914	28,948,211	3,937,536
1895	4,576,337	492,414	1905	8,779,259	1,368,686	1915	39,361,464	6,799,693

British Columbia.

According to returns received from the smelters, the total quantity of copper contained in matte, blister, and copper-sulphate produced in British Columbia during 1915, and including an estimate of smelter recovery for copper ores exported, was 56,692,988 pounds, after deducting the amount of copper produced from foreign ores. The production of 1914 on a similar basis was 41,219,202 pounds, and in 1913, 45,791,579 pounds.

Returns of smelter production in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The following table shows that the production in 1915 exceeded by over six million pounds, that of 1912, which had been a maximum and that the value of the production in 1915 was more than double that of 1908, when this Department first collected returns of smelter production.

British Columbia: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.
1908	37,041,115	$4,892,390	1912	50,526,656	$8,256,561
1909	35,658,952	4,629,245	1913	45,791,579	6,991,916
1910	35,270,006	4,492,693	1914	41,219,202	5,606,636
1911	33,279,553	4,366,198	1915	56,692,988	9,793,714

Since 1909 the method of compilation of statistics of copper production by the Provincial Bureau of Mines of British Columbia, which is based upon ore shipments from mines, provides for a deduction of five pounds of copper per ton of ore shipped on account of smelter losses, a method which gives a result closely approximating that obtained by this Branch. Previous to 1909 no allowance for smelter losses was made.

The production of copper in this Province, according to the Provincial record, reached a total of 56,918,405 pounds in 1915, as compared with 45,009,699 pounds in 1914. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, and the production by districts since 1910 are shown in the tables following:—

British Columbia: Copper Content of Ores Shipped.†

Calendar Year.	Copper contained in ores shipped.	Increase or Decrease.		Value.
	Pounds.	Pounds.	%	
1894	324,680			$ 31,039
1895	952,840	628,160	193·00	102,526
1896	3,818,556	2,865,716	301·00	415,459
1897	5,325,180	1,506,624	39·00	601,213
1898	7,271,678	1,946,498	36·00	874,783
1899	7,722,591	450,913	6·00	1,359,948
1900	9,977,080	2,254,489	29·00	1,615,289
1901	27,603,746	17,626,666	177·00	4,448,896
1902	29,636,057	2,032,311	7·00	3,445,488
1903	34,359,921	4,723,864	16·00	4,547,735
1904	35,710,128	1,350,207	3·7	4,579,110
1905	37,692,251	1,	5·6	5,876,222
1906	42,990,488	5,298	14·1	8,287,706
1907	40,832,720	(d) 2,157,	5·02	8,168,177
1908	47,274,614	6,441,894	15·8	6,244,031
1909	45,597,245	(d) 1,677,369	(d) 3·6	5,918,522
1910‡	38,243,934			4,871,512
1911‡	36,927,656	(d) 1,316,278	(d) 3·4	4,571,644
1912‡	51,546,537	14,618,881	39·6	8,408,513
1913‡	46,460,305	(d) 4,996,232	(d) 9·7	7,094,489
1914‡	45,009,699	(d) 1,450,606	(d) 3·1	6,121,319
1915‡	56,918,405	11,908,706	26·4	9,835,500

† As published by British Columbia Bureau of Mines. ‡ Allowing 5 pounds copper per ton of ore for smelter losses.

British Columbia: Production of Copper by Districts.‡

(In pounds).

	1910.	1911.	1912.	1913.	1914.	1915.
Cariboo—Omineca				1,838	6,000	2,831,279
Cassiar—Skeena, etc.		19,151	88,403	1,336	11,123,376	21,915,481
West Kootenay—						
Nelson	231,936		26,257	815,126	586,764	30,240
Trail creek	3,577,745	3,429,702	2,539,900	2,538,661	3,779,830	4,651,681
Yale—						
Boundary	31,354,985	22,327,359	33,372,199	28,621,973	16,428,959	17,402,662
Ashcroft & Kamloops	1,178	152,723		29,505	14,525	295,164
Similkameen				8,073		21,701
Coast districts	3,078,090	10,998,721	15,429,778	14,443,793	13,070,245	9,770,197
Totals	38,243,934	36,927,656	51,456,537	46,460,305	45,009,699	56,918,405

‡ After deducting five pounds of copper per ton of ore for slag losses.

According to the preceding table, the ores from the Cassiar produced in 1915, 38·5 per cent of the total; those from the Boundary 31·1 per cent; the Trail and Nelson divisions came in for 8·2 per cent, and the Coast district for 17·2 per cent; and the Cariboo for 5 per cent.

"The average assays of the copper ores of the various camps, based upon the copper recovered were as follows:—

"Boundary 0·708 per cent; Coast, Omineca and Cassiar 1·94 per cent; and Rossland 0·686 per cent.

"Copper mining is now the most important form of mining in the Province, and in 1915 it practically equalled in value the entire total value of the other lode minerals produced, and exceeded, considerably the value of coal and coke production. It forms 47·4 per cent of the total value of metalliferous mines, and 33·4 per cent of the total mineral production."*

In the Boundary the production was mainly from the mines of two of the large smelting companies: The Granby Consolidated Mining, Smelting & Power Co., Ltd., and the British Columbia Copper Co., Ltd.

These two companies operate their own smelters and convert their matte to blister copper. The low grade ores of this district are self-fluxing and very uniform in character, averaging a little over one per cent in copper, and from $1 to $2 in gold and silver.

The British Columbia Copper Company have been steadily developing their properties at Princess camp in the Similkameen, employing a large number of men. Some properties were producing during 1915 and we may look forward to the eventual establishment in that part of the country of another important copper producing centre.

Much development and some shipments are reported from the Ashcroft and Nicola divisions.

In the interior the main shippers were, at Rossland, the Centre Star and Le Roi groups, owned by the Consolidated Mining and Smelting Co., and the Le Roi II (Josie) mine. Besides these, shipments were made from the Nelson district by the Queen Victoria mine and a few other operators.

In the Kamloops division the Iron Mask mine is the only important shipper.

Much development was done in the neighbourhood of New Hazelton in the Omineca mining division, and the Rocher Déboulé mine, after a couple of years of extensive development, has become an important producer.

In the Boundary district, the production was about the same as that of 1914, which had been much below the production of 1912 and 1913—but this decrease in production for the last two years is more than offset by the large increase in production of the Coast district, which now ranks

*The Report of the Minister of Mines, British Columbia, 1915.

as the principal producer of copper ores in British Columbia with heavy shipments from the Hidden Creek mine on Observatory Inlet; the Britannia mines on Howe Sound and the Marble Bay mines on Texada island.

Yukon.

The main shipments from this Territory have been from the Pueblo mine near Whitehorse. This property was idle during 1915, but the Company was reorganized as the Yukon Mining Company, and it will likely be again an important producer. The two principal shippers were: the Grafter and the Anaconda mines—both in the Whitehorse division.

GOLD.

The production of gold in Canada in 1915 reached a total of 918,056 fine ounces, valued at $18,977,901, as compared with 773,178 fine ounces, valued at $15,983,007 in 1914, and was made up as follows: (a) gold derived from alluvial workings $5,524,476, or 29 per cent of the total; (b) gold obtained from the crushing of free milling quartz ores, *i.e.*, stamp mill bullion, $8,909,170 or 47 per cent; and (c) gold obtained from ores and concentrates sent to the copper and lead smelters, $4,544,255 or 24 per cent of the total production.

The production in 1914 included: (a) gold derived from alluvial workings $5,687,501 or 35·6 per cent of the total; (b) gold obtained from the crushing of free milling quartz ores, *i.e.*, stamp mill bullion $6,051,968, or 37·9 per cent; and (c) gold obtained from ores and concentrates sent to the copper and lead smelters $4,243,538, or 26·5 per cent of the total production.

Statistics of the annual gold production of Canada are shown in the following table:—

Annual Production of Gold in Canada, 1858-1915.

Year.	Fine ounces‡	Value.	Year.	Fine ounces‡	Value.	Year.	Fine ounces‡	Value.
1858....	34,104	$ 705,000	1878....	74,420	$1,538,394	1898 ..	666,386	$13,775,420
1859....	78,129	1,615,072	1879	76,547	1,582,358	1899...	1,028,529	21,261,584
1860....	107,806	2,228,543	1880....	63,121	1,304,824	1900...	1,350,057	27,908,153
1861....	128,973	2,666,118	1881....	63,524	1,313,153	1901...	1,167,216	24,128,503
1862....	135,391	2,798,774	1882....	60,288	1,246,268	1902...	1,032,161	21,336,667
1863....	202,498	4,186,011	1883....	53,853	1,113,246	1903...	911,559	18,843,590
1864....	199,605	4,126,199	1884....	51,202	1,058,439	1904 ..	796,374	16,462,517
1865....	192,898	3,987,562	1885....	55,575	1,148,829	1905...	684,951	14,159,195
1866....	152,555	3,153,597	1886....	70,782	1,463,196	1906 ..	556,415	11,502,120
1867....	145,775	3,013,431	1887	57,460	1,187,804	1907 ..	405,517	8,382,780
1868.....	134,169	2,773,527	1888	53,135	1,098,610	1908 ...	476,112	9,842,105
1869.....	102,720	2,123,405	1889....	62,653	1,295,159	1909...	453,865	9,382,230
1870....	83,415	1,724,348	1890....	55,620	1,149,776	1910...	493,707	10,205,835
1871....	105,187	2,174,412	1891....	45,018	930,614	1911 ..	473,159	9,781,077
1872....	90,283	1,866,321	1892....	43,905	907,601	1912...	611,885	12,648,794
1873....	74,346	1,536,871	1893	47,243	976,603	1913...	802,973	16,598,923
1874....	97,856	2,022,862	1894....	54,600	1,128,688	1914 ..	773,178	15,983,007
1875.....	130,300	2,693,533	1895....	100,798	2,083,674	1915...	918,056	18,977,901
1876.....	97,729	2,020,233	1896....	133,262	2,754,774	.....	.....	.....
1877.....	94,304	1,949,444	1897....	291,557	6,027,016	.....	.....	.....

‡ Calculated from the value: one dollar = 0·048375 oz.

Gold was first discovered in various provinces about 1858, and the production gradually increased to over four million dollars in 1863, but fell again to $907,601 in 1892. The discovery of gold in the Yukon and other discoveries in 1896 gave the mining industry a new impetus, resulting in a rapid increase in the gold production, which, in 1900, reached the high mark of nearly twenty-eight million dollars. From this maximum it decreased again to a little over eight million dollars in 1907. With the

discovery and development of the Porcupine mines in Ontario, gold production has rapidly increased again.

Exports and Imports.—The exports of gold in dust, nuggets etc., during 1915 were valued at $16,528,143.

The imports during the calendar year 1915 were: gold bullion, valued at $1,028,405; gold coins $19,910,229, and manufactures of gold and silver, valued at $464,294.

The Dominion Assay Office in Vancouver, operated in connexion with this Department, receives, assays, and purchases crude bullion, amalgam, nuggets, and dust, the resultant bullion being re-sold. The total quantity of bullion thus received during the twelve months ending December 31, 1915, was 183,924·49 ounces, which, after melting was reduced to 179,751·68 ounces and valued at $2,736,302.31, after deducting office charges.

The receipts were mostly from British Columbia and the Yukon, with also a few small deposits from Alaska and Alberta.

Refined Metal.—A refinery is in operation at the Royal Mint at Ottawa and shipments of gold have been received from various provinces.

There is but one other refinery in Canada producing fine gold; that of the Consolidated Mining and Smelting Co. of Canada, Limited, at Trail, B.C., where the gold is mainly recovered from the high grade silver-lead ores and the "dry" ores shipped to the smelter. Its annual output is given below in the table following:—

Production of Refined Gold at Trail, B.C.

Year.	Ounces.	Year.	Ounces.	Year.	Ounces.
1904	4,336	1908	15,316	1912	12,118
1905	8,602	1909	18,241	1913	11,977
1906	9,993	1910	13,298	1914	11,088
1907	10,395	1911	15,270	1915	17,813

The production of gold by provinces is given in the following table in which it will be seen that Ontario, since the discovery of the Porcupine camp, has gradually increased its production, and to such an extent that in 1915 it produced 44·3 per cent of the total, as against 14·1 per cent in 1912.

Production of Gold by Provinces, 1913, 1914, and 1915.

	1913.		1914.		1915.	
	Fine ounces.‡	Value.	Fine ounces.‡	Value.	Fine ounces.‡	Value.
Nova Scotia	2,174	$ 44,935	2,904	$ 60,031	6,636	$ 137,189
Quebec	701	14,491	1,292	26,708	1,099	22,720
Ontario	219,801	4,543,690	268,264	5,545,509	406,577	8,404,693
Alberta			48	992	195	4,026
British Columbia	(a) 297,459	6,149,027	(a) 252,730	5,224,393	(a) 273,376	5,651,184
Yukon	282,838	5,846,780	247,940	5,125,374	230,173	4,758,088
Totals	802,973	16,598,923	773,178	15,983,007	918,056	18,977,901

‡ Calculated from the value: one dollar = 0·048375 oz.

	1913.	1914.	1915.
(a) As follows: Gold from placer mining	$ 510,000	$ 565,000	$ 770,000
Gold from vein mining	5,639,027	4,659,393	4,881,184
	6,149,027	5,224,393	5,651,184

The exact value of fine gold is [illegible] dollars per ounce equivalent to $20·67 (34. (United States Standard.) In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by 1/20·67 or 0·048375.

Nova Scotia.

The gold production of this Province, which is derived almost entirely from quartz ores, is reported by the Provincial Department of Mines in 1915, as 6,636 fine ounces, valued at $137,180, compared with 2,904, fine ounces, valued at $60,031 for the year 1914, *i.e.*, an increase of 128 per cent.

The production of Nova Scotia which was 6,863 fine ounces in 1862, reached a maximum of 30,348 fine ounces in 1902; then decreased gradually, reaching in 1913 a minimum of 2,174 fine ounces. It is interesting to note that the production in 1915 is nearly identical to that of 1862, the first year returns were reported.

Statistics of the annual production since 1862, with also the production by districts during the 12 months ending September 30, 1915, and the annual production by district since 1862, as published by the Provincial Mines Department, are given in the following table:—

Nova Scotia: Annual Production of Gold.

Year.	Tons treated.	Fine ounces.	Value.	Yield of gold per ton.	Year.	Tons treated.	Fine ounces.	Value.	Yield of gold per ton.
1862	6,473	6,863	$141,871	$21 91	1880	49,160	24,673	$510,029	$13 02
1863	17,000	13,180	272,448	16 02	1890	42,749	22,978	474,990	11 11
1864	21,431	18,883	390,349	18 21	1891	36,151	21,841	451,503	12 42
1865	24,421	24,011	496,352	20 32	1892	42,552	18,868	389,965	11 98
1866	32,187	23,776	491,491	15 28	1893	42,454	18,446	381,095	8 99
1867	31,384	25,763	532,563	16 96	1894	55,257	18,834	389,338	7 04
1868	32,259	19,377	400,555	12 41	1895	60,000	21,919	453,119	7 47
1869	35,144	16,855	348,427	19 91	1896	69,169	23,876	493,568	7 13
1870	30,824	18,740	387,392	12 56	1897	73,192	27,195	562,165	7 68
1871	30,787	18,139	374,972	12 17	1898	82,747	26,054	538,590	6 50
1872	17,[illegible]9	12,352	255,349	14 94	1899	114,226	29,876	617,604	5 50
1873	17,[illegible]	11,180	231,122	13 05	1900	87,390	28,955	598,553	6 85
1874	13,[illegible]4	8,623	178,244	12 87	1901	91,948	26,339	544,963	5 32
1875	14,810	10,576	218,629	14 76	1902	94,042	30,348	627,357	6 68
1876	15,490	11,300	233,585	15 08	1903	103,856	25,533	527,806	5 08
1877	17,369	13,925	329,205	18 95	1904	85,436	10,362	214,209	4 71
1878	17,980	11,864	245,253	13 63	1905	87,774	13,707	283,353	4 90
1879	15,936	12,980	268,328	16 83	1906	66,059	12,223	252,676	3 82
1880	13,967	12,472	257,823	18 42	1907	58,550	13,675	282,686	4 82
1881	16,556	10,147	209,755	12 66	1908	1,536	11,842	244,799	3 97
1882	21,081	13,307	275,090	13 04	1909	6,790	10,193	210,711	3 71
1883	25,954	14,571	301,207	11 60	1910	43,006	7,928	163,891	3 81
1884	25,186	15,168	313,554	12 44	1911	15,428	7,781	160,854	8 78
1885	28,890	20,945	432,971	14 98	1912	11,360	4,488	90,638	6 51
1886	29,010	22,038	455,564	15 70	1913	7,324	2,174	44,935	6 13
1887	32,280	20,009	413,631	12 81	1914	13,156	2,904	60,031	4 56
1888	36,178	21,137	436,930	12 08	1915	25,204	6,636	137,180	5 44
					Total.	2,163,323	999,833	18,601,282	8 60

Nova Scotia: District Details of Gold Production.† (Year ending September 30, 1915).

District.	Tons crushed.	Total yield of gold.			Average yield of gold per ton.		
		ounces.	dwt.	grs.	ounces.	dwt.	grs.
Caribou	322	293	18			18	6
Caribou (Moose River)	276	64	18			4	17
Gold River	40	66	9		1	13	5
Harrigan Cove	17	8	11			10	1
Kempville	3	2	15			18	3
Lake Catcha	44	101	10	7	2	6	3
Mallaga Barrens	102	116	16		1	2	22
Miller's Lake	18	8	19			9	22
Montague	61	135	10		2	4	10
Oldham	321	362	14		1	15	1
Sherbrooke	19,093	2,125	9	16		2	15
Shier's Point	251	26	4	12		2	2
Stormont	1,594	1,479	4	19		18	13
Tangier	1,969	472	9	19		4	19
Waverley	36	5	18			3	7
Wagamatkook	274	41	14	19		3	1
Mortared		4	15				
West Gore (gold in concentrates)	24,421	5,517	16	20		4	12
	783	1,698	5		2	3	9
Totals	25,204	7,216	1	20		5	17

†From the Report of the Provincial Mines Department.

Nova Scotia: Production of Gold from 1862 to 1915.†

District.	Tons crushed.	Total Yield of Gold.			Average Yield of Gold per Ton.			Valued at $19 per ounce
		ounces.	dwt.	grs.	ounces.	dwt.	grs.	
Caribou and Moose River *a*	232,831	61,678	7	14		5	13	$1,171,889
Montagu	29,801	42,368	2	8	1	8	10	804,996
Oldham	59,669	68,250	12	22	1	2	21	1,296,762
Renfrew	61,795	48,699	7	19		15	15	925,289
Sherbrooke	326,112	136,111	4	20		9	14	2,586,113
Stormont	529,108	122,749	3	8		4	16	2,332,158
Tangier	69,397	29,437	18	7		8	12	559,320
Uniacke *b*	63,351	43,983	1	17		13	21	835,679
Waverley	155,536	69,986	8	16		9	0	1,329,742
Brookfield *c*	93,527	38,709	2	2		8	7	735,473
Salmon River *d*	118,819	41,852	5	20		7	1	795,194
Whiteburn *e*	6,907	9,800		2	1	8	9	186,200
Lake Catcha	31,972	28,311	8	0		17	17	537,914
Rawdon *e*	12,189	9,606	8	10		15	15	182,519
Wine Harbour	77,396	34,992	15	11		9	1	664,863
Fifteenmile Stream *d*	36,878	17,363	0	8		9	10	329,897
Malaga Barrens	23,028	20,422	8	6		17	18	388,026
West Gore (from Stibnite ores)	4,023	6,211	0	10	1	10	21	118,009
Other Districts	146,438	75,835	10	12		10	9	1,440,879
Totals	2,068,798	926,361	0	17		8	23	17,600,916

a From 1869, *b* from 1868, *c* from 1887, *d* from 1883, *e* from 1882, *f* from 1905.
† From the Report of the Provincial Mines Department.

Quebec.

The gold production in Quebec during 1915 was 1,099 fine ounces, valued at $22,720, as against 1,292 fine ounces, valued at $26,708 in 1914, a decrease of 15 per cent. This production is derived from the pyritic mines of the Eastern Townships, which are worked chiefly for the sulphur and copper contents of the ore.

No alluvial production has been reported for a number of years. The following table gives the production for Quebec from 1877 to 1915:—

Quebec: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces‡.	Value.
1877	583	$ 12,057	1890	65	$ 1,350	1903	180	$ 3,712
1878	868	17,937	1891	87	1,800	1904	140	2,900
1879	1,160	23,972	1892	628	12,987	1905	191	3,940
1880	1,605	33,174	1893	759	15,696	1906	165	3,412
1881	2,741	56,661	1894	1,412	29,196	1907		
1882	827	17,093	1895	62	1,281	1908		
1883	860	17,787	1896	145	3,000	1909	193	3,990
1884	422	8,720	1897	44	900	1910	124	2,565
1885	103	2,120	1898	295	6,089	1911	613	12,672
1886	193	3,981	1899	238	4,916	1912	642	13,270
1887	78	1,604	1900			1913	701	14,491
1888	181	3,740	1901	145	3,000	1914	1,292	26,708
1889	58	1,207	1902	391	8,073	1915	1,099	22,720
						Total	19,290	398,721

‡Calculated from the value: one dollar = 0·048375 ounces.

Ontario.

The gold production in Ontario, which in 1913 had exceeded the total of all the other years since 1886, nearly doubled that figure in 1915, amounting to 406,577 fine ounces, valued at $8,404,693, as against 268,264 fine ounces, valued at $5,545,509 in 1914.

The Porcupine district has since its development, been the main producer. Other producing districts were: Kirkland Lake and Munro township, in Timiskaming district; and Long Lake, near Sudbury, Algoma district.

Statistics of the production of gold in Ontario, since 1887 are shown in the following table:—

Ontario: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1887	327	$ 6,760	1897	9,157	$ 189,294	1907	3,212	$ 66,399
1888			1898	12,863	265,880	1908	3,212	66,389
1889			1899	20,394	421,591	1909	1,569	32,425
1890			1900	14,391	297,495	1910	3,089	63,849
1891	97	2,000	1901	11,844	244,837	1911	2,062	42,625
1892	344	7,118	1902	11,118	229,828	1912	86,523	1,788,596
1893	708	14,637	1903	9,096	188,036	1913	219,801	4,543,690
1894	1,917	39,624	1904	1,935	40,000	1914	268,264	5,545,509
1895	3,015	62,320	1905	4,402	91,000	1915	406,577	8,404,693
1896	5,563	115,000	1906	3,202	66,193	Total	1,104,682	22,835,797

‡Calculated from the value: one dollar = 0·048375 ounces.

It may be noted from the table "Production of Gold by Provinces," that Ontario from third rank, has become by far the largest producer of gold in Canada.

The remarkable increase of these last three years was brought about by the successful development of the Porcupine district and recently by the extension of milling facilities in that camp.

The following table shows the rapid increase in production of the Porcupine camp, in the last few years:—

Porcupine Gold Production 1910-1915.*

Year.	Value.	Year.	Value.
1910	$ 35,539	1913	$ 4,284,928
1911	17,187	1914	5,203,229
1912	1,730,628	1915	7,580,766
		Total	18,852,277

*From the Report of Timiskaming and Northern Ontario Railway Commission.

The principal producers during 1915 were:—

Operator.	Mine.	District.
Canadian Exploration Co.	Long Lake	Algoma.
		Timiskaming:—
Acme Gold Mines, Ltd.	Acme	Porcupine.
Dome Mines Co., Ltd.	Dome	"
Dome Lake Mines, Ltd.	Dome Lake	"
Hollinger Gold Mines, Ltd.	Hollinger	"
McIntyre Porcupine Mines, Ltd.	McIntyre	"
Mines Leasing and Development Co.	Rea	"
Porcupine Crown Mines, Ltd.	Porcupine Crown	"
Vipond Mines Co. Ltd.	Porcupine Vipond	"
Wm. C. Offer et al.	Porphyry Hill	"
Schumacher Gold Mines, Ltd.	Schumacher	"
Teck-Hughes Gold Mines, Ltd.	Teck-Hughes	Kirkland L.
Tough Oakes Gold Mines, Ltd.	Tough Oakes	"
Croesus Gold Mines, Ltd.	Dobie-Leyson	Munro.

Other districts besides Timiskaming and Sudbury, though not as yet arrived at the producing stage, have shown much activity during 1915 and may soon become important mining centres.

The principal of these districts is the Kowkash district which is reported on by Mr. P. E. Hopkins in Bull. No. 27 of the Ontario Bureau of Mines, in the following terms:—

"The Kowkash gold area is situated in the centre part of the district of Thunder Bay, Ontario, northeast of Lake Nipigon and is traversed by the National Transcontinental railway—Kowkash station is 297 miles west of Cochrane."

"A spectacular gold find was made by E. W. King Dodds, on August 21, 1915, nine miles northwest of Kowkash, near Howard Falls, on the river Kawachkagama. E. W. King Dodds made his discovery while walking over the rocky hill below Howard Falls, which had been burned clean of moss and trees on the previous day. The news of the rich find caused a rush of about 400 prospectors to the neighborhood and 75 to 100 claims were staked within three weeks."

Other gold discoveries were subsequently made in the surrounding district, the most important being at Tashota, 22 miles west of Kowkash, where gold and telluride were discovered.

In the Kenora district much interest was caused by the report of rich gold findings on the Rognon property, near Wabigoon lake.

In the Boston Creek district, Timiskaming, the promising development work on the Kensie property attracted many prospectors to the area and resulted in new discoveries in this district. The Provincial Bureau of Mines had a report made on this district, and published in 1916.*

Much prospecting and development have been done in the adjoining district of Goodfish lake.

The most spectacular find probably ever made was that of August 1915, in Munro township, Timiskaming, on the Dobie-Leyson property,

*Bulletin No. 29 of the Ontario Bureau of Mines, on Boston Creek and Goodfish Lake Gold Areas.

now called Croesus Mine. Specimens from this property have been rep ted to run from 2,000 to 3,000 ounces in gold.

The following notes are taken from the respective company's reports:—

The Dome Mines Co. Ltd.

"Record of production for twelve months ending March 31, 1916:—

Tons of ore milled	347,640
Bullion recovered by amalgamation	$1,130,748.95
" " cyanidation	$648,209.96
Per cent of value recovered by amalgamation	59·04
" " " cyanidation	33·84
Total value recovered	$1,778,958.91
Average yield per ton	5·117
Per cent of value recovered	92·88
Per cent of possible running time	95·00

"The mill operated successfully 95·0 per cent of the possible time during the period, crushing and treating at a cost of $0·910 per ton, being a net reduction of $0·089 per ton, as compared with that of the previous year.

"The extraction, 92·88 per cent, compared with th t achieved last year (90·6 per cent) is noteworthy, and the lowering of the working costs $0·089 most satisfactory, as in this department also the cost of supplies has advanced greatly.

"The additions and improvements in the mill, which will ultimately give a capacity of 45,000 tons per month, are expected to enable us to still further improve the extraction, and to considerably reduce the working costs. At the start of the fiscal year the monthly crushing rate was 23,630 tons, and at the close 34,300 tons."

The Dome is essentially a low grade proposition.

Dome Lake Mining and Milling Co. Ltd.

Year ending December 31, 1915:—

Tons of ore milled	11,728
Gross value of ore treated	$106,941.40
Average value per ton treated	9.12
Loss per ton treated (tailings)	1 83
Value recovered by amalgamation	$70,676.48 or 66·10%
" " concentration	$14,810.56 or 13·83%
Total value recovered	$85,487 04 or 79·93%
Amalgam produced	13,668·50 ozs.
Bullion produced	3,966·98 "
Value of bullion per ounce	$17.82
Concentrates produced	221·64 tons
Average value per ton	$65 92

"An average of 1,081·3 tons per month was treated in the mill. With alterations now being made it will handle from 1,500 to 1,800 tons per month."

Hollinger Gold Mines, Ltd.

Year ending December 31, 1915:—

	Hollinger.	Acme.	Total.
Tons of ore milled	334,750	106,486	441,236
Average value per ton			$10.11
Total values sent to mill			$3,384,666.84
Average tons per day			917
Per cent of possible running time			93·8
Average tons per 24 hours of running time			978
Stamp duty tons per 24 hours of running time			14·72

Unrecovered values:—

Concentrates stored for re-treatment (9,500 tons)	$81,763.00
Lost in filter tails	133,090.00
Total	$214,853.0
	$3,169,813.84
Values recovered	0·40
Value per ton in tailings	0·574
Cyanide consumed per ton of ore, in pounds	1·896
Lime " " " "	0·467
Zinc " " " "	0·0032
Acid " " " "	0·0021
Lead acetate " " " "	1·909
Tons of solution precipitated per ton of ore	0·244
Zinc added per ton of solution	5·074
Average value of pregnant solution	

Year.	Ore milled in tons.	Value recovered.	Dividends paid.
	1,000	$ 46,082.52	
1911	45,195	933,682.00	$ 270,000
1912	138,291	2,466,220.24	1,170,000
1913	208,936	2,688,354.80	1,170,000
1914	334,749	3,249,698.33	1,560,000
1915			
Total	728,171	9,384,037.89	4,170,000

COMPARATIVE COSTS PER TON FOR THE YEARS 1913-14-15.

	1913.	1914.	1915.
Tons milled per day	379	584	
Cost per ton of:—			
Mining	$3.09	$2.10	9
Milling	1.63	1.22	1.00
General	1.38	1.10	.65
Depreciation	.88	.79	.44
Total	$6.97	$5.21	$3.98

"During the past year we have succeeded in reducing the actual working costs to $3.41 per ton, and were it not for the possibility of advances in the prices of supplies, I should not hesitate to promise a reduction from the coming year which would show a net cost of approximately $3.10 per ton.

"The results of expenditures upon plant have shown steadily increasing tonnages and steadily decreasing costs.

"We have now altered our concentrate treatment plant so that it is no longer desirable to stack this product for future treatment, and we shall

as rapidly as possible reclaim those concentrates which have been conserved during the past two years.

"It is expected that by means of new alterations the capacity of the mill will be raised to 1,900 tons per day, and that a slightly improved extraction will be obtained owing to the increased agitation provided." (P. A. Robbins, General Manager).

The report contains a most interesting table on the cost of supplies and the advance in prices.

The estimated ore reserves are reported as being 1,600,800 tons, valued at $16,031,600, or $10.02 per ton.

McIntyre, Porcupine Mines.

Year ending March 31, 1916:—

Tons of ore milled	105,758
Average value	$7·709
Extraction per ton	$7·375
Tailing loss per ton	$0·334
Gross value	$815,345.49
Bullion produced an . by-products obtained	779,990.94
Total loss in tails	35,354.50
Per cent of extraction	95·6
Cost per ton of ore milled	$4.28
Profit " " "	$3.09
Per cent of possible running time	94·4

"Since the beginning of milling operations in 1912 to the end of the fiscal year the property has produced in gold bullion $1,800,241.28 recovered from milling 237,891 tons of ore of an average value of $8.10.

"The estimated ore reserves, as of March 31, 1916, were 201,920 tons, valued at $2,247,128 or an average value of $11.12 per ton."

Porcupine Crown Mines, Limited.

Year ending December 31, 1915:—

	Mine ore.	Amalgamation. Tails.	Total.
Tons of ore milled	41,326	5,093	46 419
Average value of heads	$14.46	$3.15	
" " tails	0·336	0·45	
" extraction	97·70%	85·77%	
Cost per ton of ore milled	$ 6.72	$0.97	$6.09
Gross value of production			$615,537.60
Mint charges			1,972.17
Mine operation expense			282,916 88
" net profit			330,648.55
Dividend paid in 1915			240,000 00

"While the change in the character of the ore body reduces the grade per ton, the increase of tonnage gives us practically the same gold contents in the vein.

"Operating costs were appreciably reduced and the extraction in the mill was increased."

Porcupine Vipond Mines, Limited.

Year ending December 31, 1915:—

Tons of ore milled	35,899
Gross value of ore treated	$269,667.42
Average value per ton treated	7.51
Loss " " (tailings)	0.59
Recovery " "	6.92
Extraction	92.1%
Gold bullion produced (11,978.66 fine oz.)	247,598.56
Silver " " (1,455.39 ")	713.73
Total value recovered	248,312.29
" lost in tailings	21,355.13

"Present cost of supplies as compared with costs of 1914 show increases approximately as follows: Explosives 50 per cent; cyanide 33 per cent; zinc dust 300 per cent; other materials, such as steel, oils, pipe fittings and general supplies 10 to 20 per cent— nevertheless in spite of the considerable increased cost of these supplies, we have been successful in making our total costs for this year, lower than heretofore.

"Different improvements during the year have brought the capacity of the mill up to 3,600 tons per month.

"The increase in the capacity of the mill has resulted in lowering costs from $6.44 per ton in 1914 to $5.47 in 1915."

Schumacher Gold Mines, Limited.

Year ending June 30, 1916—(nine months only):—

Tons of ore milled	30,120
Operating cost	$132,059.45
Bullion production	163,992.20
Net profit	31,932.75

"The mill has been in operation since the middle of September, 1915, and is treating at present about 140 tons per day.

"The average cost per ton for the five months ending February 29, 1916, was $4.96, and the average cost per ton for the four months ending June 30, 1916, was $3.88.

"The total ore reserves amount to 64,900 tons with an estimated value of $396,700 or $6.11 per ton."

Manitoba.

There was no production in Manitoba, during 1915, but development work was reported from Star lake, near the eastern boundary of the Province, and from Rice Lake, Long Lake, and Gold Lake districts, east of Lake Winnipeg.

Herb Lake.—Gold bearing quartz veins of a promising character have been found on the east side of Wekusko or Herb lake, about 85 miles northeast of Pas.

Flin Flon Lake.—About 70 miles northwest of Pas on the Saskatchewan boundary much activity has been shown, especially near Flin Flon lake, and Schist lake. Extensive diamond drilling done by the Great Sulphides Gold Mines, Ltd., in this district, has been reported.

Mr. E. L. Bruce of the Geological Survey who is conducting an exploration of this area reports that:—

"Gold-bearing quartz veins have now been discovered in so many parts of the belt of basic rocks extending from Amisk lake (in Saskatchewan) to Wekusko lake (in Manitoba), that there seem to be good possibilities of finding gold in paying quantities. Careful examination requires time and work. This is especially true in the eastern part where the thick deposits of Lake Agassiz clays mantle the rock surfaces. All parts of the area are easily accessible by canoe travel, but thorough prospecting will demand examination of the country inland from the main routes, and attention concentrated on a few promising claims rather than dissipated over a large number."

Saskatchewan.

In the autumn of 1913 considerable interest was created in the reported gold discoveries at Beaver lake (Amisk lake). A number of prospectors went in with the opening of navigation. A good deal of prospecting was done during 1914, and some further work in 1915, but as yet no production has been reported. Amisk lake is at the western end of the area being examined by Mr. Bruce and referred to under "Manitoba."

Alberta.

In past years there has been a small production of gold from the gravels of the Saskatchewan river. A recovery was reported for 1915 amounting to 195 ounces valued at $4,026, as against 48 ounces, valued at $992 in 1914.

Statistics of the production from Alberta, since 1887, are shown in the following table:—

Alberta: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1887.....	102	$ 2,100	1897....	2,419	$ 50,000	1907....	33	$ 675
1888.....	58	1,200	1898...	1,209	25,000	1908....	50	1,037
1889.....	967	20,000	1899....	726	15,000	1909....	25	525
1890.....	193	4,000	1900....	242	5,000	1910....	89	1,850
1891.....	266	5,500	1901	726	15,000	1911....	10	207
1892.....	508	10,506	1902....	484	10,000	1912....	73	1,509
1893.....	466	9,640	1903....	48	1,000	1913....	.....	.....
1894.....	726	15,000	1904....	24	500	1914....	48	992
1895.....	2,419	50,000	1905....	121	2,500	1915....	195	4,026
1896.....	2,661	55,000	1906....	39	800	Total....	14,927	308,567

‡Calculated from the value: one dollar = 0·048375 oz.

British Columbia.

The gold production of British Columbia in 1915 amounted to 273,376 fine ounces, valued at $5,651,184 and comprising: (a) placer gold $770,000, or 13·6 per cent of the total; (b) bullion from milling ores $405,334, or 7·2 per cent, and (c) smelter recoveries $4,475,850, or 79·3 per cent.

The statistics of lode gold represent, as closely as can be ascertained, the actual gold recovery based on smelter recoveries and bullion shipments.

There was an increase of 36 per cent in the placer production over that of 1914; a decrease of 27 per cent in the bullion from milling ores; and an increase of 9 per cent in smelter recoveries.

In 1914 the total production was 252,730 ounces, valued at $5,224,393 comprising: (a) placer gold $565,000; (b) bullion from milling ores $549,437; and (c) smelter recoveries $4,109,956.

The total production in 1915 showed an increase of 8·2 per cent over that of 1914, and is due to the resuming of operations on a large scale in the Boundary and Rossland camps, to the successful operation of the Anyox plant, on the Pacific coast, and to a considerable increased placer production.

Statistics of the production in British Columbia, since 1858 are given in the following table:—

British Columbia: Annual Production of Gold.

Year.	Fine ounces‡.	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1858	34,104	$ 705,000	1878	61,688	$1,275,204	1898	142,215	$2,939,852
1859	78,129	1,615,072	1879	62,407	1,290,058	1899	203,295	4,202,473
1860	107,806	2,228,543	1880	49,044	1,013,827	1900	228,916	4,732,105
1861	128,973	2,666,118	1881	50,636	1,046,737	1901	257,292	5,318,703
1862	128,528	2,656,903	1882	46,154	954,085	1902	288,383	5,961,409
1863	189,318	3,913,563	1883	38,422	794,252	1903	284,108	5,873,036
1864	180,722	3,735,850	1884	35,612	736,165	1904	275,975	5,704,9[illegible]
1865	168,887	3,491,205	1885	34,527	713,738	1905	285,529	5,902,[illegible]2
1866	128,779	2,662,106	1886	43,714	903,651	1906	269,886	5,579,039
1867	120,012	2,480,868	1887	33,558	693,709	1907	236,216	4,883,020
1868	114,792	2,372,972	1888	29,834	616,731	1908	286,858	5,929,880
1869	85,865	1,774,978	1889	28,489	588,923	1909	250,320	5,174,579
1870	64,675	1,336,956	1890	23,918	494,436	1910	261,386	5,403,318
1871	87,048	1,799,440	1891	20,792	429,811	1911	238,496	4,930,145
1872	77,931	1,610,972	1892	19,327	399,525	1912	251,815	5,205,485
1873	63,166	1,305,749	1893	18,360	379,535	1913	297,459	6,149,027
1874	89,233	1,844,618	1894	25,664	530,530	1914	252,730	5,224,393
1875	119,724	2,474,904	1895	61,289	1,266,954	1915	273,376	5,651,184
1876	86,429	1,786,648	1896	86,504	1,788,206			
1877	77,796	1,608,182	1897	131,805	2,724,657	Total	7,617,916	157,476,339

‡Calculated from the value: one dollar = 0·048375 oz.

The record of production of placer gold is given as ascertained by the Provincial Mineralogist, who, in his Annual Report states that:—

"Great difficulty is found in obtaining reliable figures, since the work is, in many cases, carried out by individuals or unorganized groups of men who keep no books, frequently paying wages, or for supplies, in gold-dust, which, being readily transported, is scattered, and the tax imposed thereon by law is thus evaded.

"This year's output shows an increase, as compared with 1914, of $205,000, chiefly due to a better season than usual in the Atlin and Cariboo districts.

"Considerable work in connection with placer-mining was done in the Similkameen District, although the actual production was small.

"The production of placer gold is nearly all from the Atlin and Cariboo Districts; about 90 per cent of the total coming from these two sections."

The production of gold from lode mining as reported by The Provincial Bureau of Mines being based upon metal contents of ore shipments is naturally somewhat higher than the record of smelter recoveries. According to the Provincial Mineralogist: "The value of the gold produced from lode-mining in the Province during the year 1915, was $5,167,934, an increase, as compared with the previous year of $58,930, or about 1·15 per cent. This greater production of lode gold is due to an increased tonnage of ore mined in the Boundary and Rossland Districts, and to new mines recently opened in the Skeena and Omineca Districts.

"These increases were however, somewhat offset by decreases in the Nelson and Coast Districts.

"The only large stamp-mill in operation in the Province is at the Nickel Plate mine at Hedley, in the Osoyoos Mining Division, which, this past year, milled some 74,265 tons of ore having a value of over $900,000. There are smaller stamp-mills operating at the Poorman, Queen, Mother Lode, and other mines in the Nelson Division; and in addition there are stamp-mills at the Jewel mine, Greenwood, Coronation mine, Lillooet; and Engineer mine, Atlin, which operated during the year.

"The following are the values of the gold product of the three most important camps; Rossland $2,947,439; Boundary $1,816,273; and Nelson $190,846. About 76·5 per cent of the gold production of the Province is obtained from the smelting of copper-bearing ores, the remainder mainly from stamp-milling."

The following table shows the production by districts as recorded by the British Columbia Bureau of Mines:—

British Columbia: Production of Gold by Districts, 1915.*

Districts.	Gold placer.		Gold lode.	
	Ounces.	Value.	Ounces.	Value.
Cariboo:—				
Cariboo	1 750	$ 215,000	.....	$.....
Quesnel	250	85,000	.....	.....
Omineca	600	12,000	1,524	31,501
Cassiar:—				
Atlin	18,850	377,000	875	18,086
All others	1,450	29,000	5,034	104,053
East Kootenay:—				
Fort Steele	750	15,000	.....	.....
West Kootenay:—				
Ainsworth	.....	.....	121	2,501
Nelson	50	1,000	9,233	190,846
Slocan	.....	.....	26	537
Trail creek	.....	.....	142,595	2,947,479
Others	100	2,000	15	310
Lillooet—Lillooet	400	8,000	31	641
Yale:—				
Grand Forks, Greenwood and Osoyoos	100	2,000	87,870	1,816,273
Similkameen, Nicola, and Vernon	600	12,000	101	2,088
Yale, Ashcroft and Kamloops	500	10,000	106	2,191
Coast	100	2,000	2,490	51,468
Total	38,500	$ 770,000	250,021	$5,167,934

*From Annual Report of the Minister of Mines for British Columbia.

Yukon.

The gold production of the Yukon in 1915 was $4,758,098 as compared with $5,125,374 in 1913, a decrease of 7·1 per cent. This includes a small production from lode mines.

The placer production of the Yukon in 1915 is estimated at 229,803 fine ounces of gold, valued at $4,750,450, and 51,706 fine ounces of silver, valued at $25,689, making the total valuation of the Yukon placer output $4,776,139.

The placer production in 1914 was estimated at 247,753 fine ounces of gold, valued at $5,122,509, and 55,744 fine ounces of silver, valued at $30,554, or a total valuation of $5,153,053.

Statistics of the annual production of gold in Yukon since 1885, are shown in the following table:—

Annual Production of Gold in Yukon.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1885	4,837	$ 100,000	1896	14,513	$ 300,000	1907	152,381	$ 3,150,000
1886	.....	.....	1897	120,937	2,500,000	1908	174,150	3,600,000
1887	3,386	70,000	1898	483,750	10,000,000	1909	191,565	3,960,000
1888	1,935	40,000	1899	774,000	16,000,000	1910*	221,091	4,570,362
1889	8,466	175,000	1900	1,077,553	22,275,000	1911*	224,197	4,634,574
1890	8,466	175,000	1901	870,750	18,000,000	1912*	268,447	5,549,296
1891	1,935	40,000	1902	701,437	14,500,000	1913*	282,838	5,846,780
1892	4,233	87,500	1903	592,594	12,250,000	1914*	247,940	5,125,374
1893	8,514	176,000	1904	507,938	10,500,000	1915*	230,173	4,758,098
1894	6,047	125,000	1905	381,001	7,876,000			
1895	12,094	250,000	1906	270,900	5,600,000	Total	7,848,068	162,233,984

‡Calculated from the value: one dollar = 0·048375 oz.
*Including a small production from lode mines.

The statistics of production of gold in the Yukon district during the years between 1898 and 1906, as given in the table showing the annual production, are based primarily on the receipts of gold at the United States mints and receiving offices credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that considerable amounts of gold were produced which escaped royalty payment especially during the years of high production.

Since 1906 the statistics of gold production of the Yukon have been based on the royalty of 2½ per cent which is collected by the Interior Department. For the purpose of collecting the royalty, a fixed value of $15 per ounce is placed on the crude gold. The actual value of the deposits for a number of years, has been about $16.50 per ounce. At the Dominion Government assay office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1915, 87,040·87 ounces from the Yukon, valued, after all charges had been deducted, at $1,418,496·63, showing an average of $16.28 per ounce, as against 56,564·83 ounces, valued at $916,914·44, or an average of $16·21 per ounce in 1914.

The production of crude placer gold in the Yukon during the past six years, as ascertained by the Interior Department, and upon which a royalty of 2½ per cent has been collected, is shown in the accompanying table:—

Production of Gold in the Yukon District.

(Gross weight of dust, nuggets and bullion in ounces.)

Month.	1910.	1911.	1912.	1913.	1914.	1915.
January	16·68	.....	5·25	19·30	136·50	520·69
February	749·28	435·66	525·29	56·.0	325·50	·40
March	193·81	13·30	0·50	.....	6·75	232·13
April	0·50	.....	.....	1,293·69	1,572·65	277·84
May	43·83	16,719·16	26,158·66	5,557·35	11,668·10	17,553·29
June	54,301·17	38,499·39	54,243·03	67,594·39	67,604·85	57,884·87
July	37,942·31	42,783·38	58,283·29	57,873·50	45,067·31	49,478·87
August	47,673·06	47,677·49	56,975·55	63,315·92	49,458·17	41,015·41
September	57,695·65	48,383·63	53,225·29	58,641·62	62,744·69	47,055·83
October	51,888·18	58,690·82	66,518·01	66,798·37	63,365·22	59,984·89
November	21,404,29	11,097·51	11,648·08	26,565·50	4,308·00	7,248·17
December	3,563·75	13,130·63	7,432·72	5,183·50	3,433·43	6,001·77
	275,472·51	277,430·97	335,015·67	352,900·04	309,691·17	287,254·16

Since 1898 a royalty to the extent of $4,372,504.98 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown in the accompanying table. The difference between these figures and those shown in the table of annual production of the district which are based on mint receipts of Yukon gold, has already been mentioned, and is probably due to three factors: (1) the fixing of the value of the gold for royalty purposes at $15 per ounce, a figure probably

slightly less than the actual value of the gold, (2) the probability that in the earlier years of royalty collection, considerable quantities of gold dust left the camps unrecorded and escaped royalty payments, and (3) the fact that in the last few years there has been a small but growing production from the lode mines.

Gold Production in the Yukon, and Royalty Collected.‡

Fiscal Year.	Total gold production.	Total exemption.	Royalty collected on.	Royalty paid.
Ending June, 1898	$ 3,072,773	$ 339,845	$ 2,732,928	$273,292 82
" " 1899	7,582,283	1,699,657	5,882,626	588,262.37
" " 1900	9,809,464	2,501,744	7,307,720	730,771 99
" " 1901	9,162,082	1,927,666	7,234,416	592,660.98
" " 1902	9,566,340	1,199,114	8,367,225	331,436.79
" " 1903	12,113 015	.....	12,113,015	302,893 48
" " 1904	10,790,663	.....	10,790,663	272,217.96
" " 1905	8,222,054	.....	8,222,054	206,760.87
" " 1906	6,540,007	.....	6,540,007	163,963 25
" March 1907	3,304,791	.....	3,304,791	82,622.42
" " 1908	2,820,162	.....	2,820,162	70,505 65
" " 1909	3,260,282	.....	3,260,282	81,507.07
" " 1910	3,594,251	.....	3,594,251	89,844.10
" " 1911	4,126,728	.....	4,126,728	103,168.19
" " 1912	4,024,237	.....	4,024,237	100,606.29
" " 1913	5,018,412	.....	5,018,412	125,460.52
" " 1914	5,301,508	.....	5,301,508	132,537 69
" " 1915	4,649,634	.....	4,649,634	116,241.04

‡ From the Report of the Yukon and Mining Lands Branch of the Department of the Interior.

LEAD.

The production of lead in Canada in 1915 amounted to 46,316,450 pounds, valued at $2,593,721 as compared with 36,337,765 pounds, valued at $1,627,568 in 1914, being an increase in production of 27·4 per cent. and in value of 56·3 per cent.

The statistics of lead production since 1909 as given in the accompanying table represent the quantity of refined lead produced in Canada from domestic ores, together with a small quantity of lead contained in lead ores exported. The production has been mainly from British Columbia with occasionally small amounts from other provinces and the Yukon Territory. Statistics showing the annual production of lead in Canada since 1887 are shown in the following table:—

Annual Production of Lead.

Year.	Pounds.	Cents per pound.	Value.	Year.	Pounds.	Cents per pound.	Value.
1887	204,800	5·400	$ 9,216	1901	51,900,958	4·334	$2,249,387
1888	674,500	4·420	29,812	1902	22,956,381	4·069	934,095
1889	165,100	3·930	6,488	1903	18,139,283	4·237	768,562
1890	105,000	4·480	4,704	1904	37,531,244	4·309	1,617,221
1891	88,665	4·350	3,857	1905	56,864,915	4·707	2,676,632
1892	808,420	4·090	33,064	1906	54,608,217	5·657	3,089,187
1893	2,135,023	3·730	79,636	1907	47,738,703	5·325	2,542,086
1894	5,703,222	3·290	187,636	1908	43,195,733	4·200	1,814,221
1895	16,461,794	3·230	531,716	1909	45,857,424	*3·690	1,692,139
1896	24,199,977	2·980	721,159	1910	32,987,508	*3·687	1,216,249
1897	39,018,219	3·580	1,396,853	1911	23,784,969	†3·480	827,717
1898	31,915,319	3·780	1,206,399	1912	35,763,476	†4·467	1,597,554
1899	21,862,436	4·470	977,250	1913	37,662,703	†4·659	1,754,705
1900	63,169,821	4·370	2,760,521	1914	36,337,765	†4·479	1,627,568
				1915	46,316,450	†5·600	2,593,721

*In 1909 and 1910, average prices at Toronto as quoted by *Hardware and Metal*, in previous years average prices at New York, as quoted by *Engineering and Mining Journal*.
†Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que

For a number of years there has been a very wide divergence between the record of lead recovery and the statements of lead contained in ores shipped from the mines. While the difference is due in part to smelter losses there was also, during 1912 and 1913 especially, a considerable accumulation of lead ores at the Trail smelter. In 1915, however, the recovery of lead was but little less than that contained in ores shipped from mines apparently indicating a reduction in stocks of ores at the smelter.

The shipment of lead ores from mines and the metallic contents thereof, as reported by the mine operators, have been, during the past four years, as follows:—

Ores Shipped and Metal Contents.

Year.	Lead ores shipped in tons.	Lead contents in pounds.	Silver contents in ounces.
1912	89,814	45,896,537	2,366,294
1913	85,978	54,807,570	2,564,155
1914	70,207	80,527,130	2,501,820
1915	88,647	48,708,005	2,954,175

Previous to 1904 lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion to be refined abroad. A lead refinery employing the Betts electrolytic process has been in operation at Trail, B.C., since 1904 treating the base bullion produced by the lead blast furnaces.

The North American Smelting Company erected a plant at Kingston, Ontario, which started operations during the latter part of 1912, treating scrap and lead dross as well as ores from the United States, British Columbia, and Ontario. This plant closed down November 1, 1913, and has not since resumed operations.

The total production of refined lead, from all sources, has been as follows:—

Refined Lead Produced.

Year.	Pounds of refined lead produced.	Year.	Pounds of refined lead produced.	Year.	Pounds of refined lead produced.
1904	7,519,440	1908	36,549,274	1912	37,008,490
1905	15,804,509	1909	41,883,614	1913	39,663,766
1906	20,471,314	1910	32,987,508	1914	36,443,706
1907	26,607,461	1911	23,525,050	1915	43,518,618

Prices.—The average price for soft lead in 1915 on the London market was £22 17s. 10d., as compared with £18 13s. 9d. in 1914.

The price of lead at Montreal, the main Canadian market was higher in 1915, as well as in 1914 and 1913, than the New York and London values. The average price of lead at Montreal in 1915 was 5·600 cents per pound, as against 4·979 in London, 4·673 in New York, and 4·567 in St. Louis.

The Toronto price in winter is about the same as that at Montreal but the latter falls during the period of summer freight rates, about 10 cents per 100 pounds below the former.

The yearly and monthly average prices of lead in Montreal, London, and New York, for the last few years are given in the following tables:—

Lead Prices.

Yearly Average Prices of Lead in Montreal, London, New York, and St. Louis.

(Values in cents per pound.)

	1909	1910	1911	1912	1913	1914.	1915
Montreal	4·268	4·236	4·480	4·467	4·659	4·479	5·600
London	2·804	2·778	2·909	4·021	4·071	4·146	4·979
New York	4·273	4·136	4·470	4·471	4·520	3·862	4·673
St. Louis	4·133	4·012	4·286	4·360	4·248	4·737	4·567

Monthly Average Prices of Pig Lead at Montreal.*

(Values in cents per pound.)

Month.	1909	1910	1911	1912	1913	1914.	1915.
January	4·35	4·48	4·41	4·04	4·32	4·28	4·27
February	4·38	4·40	4·42	4·07	4·18	4·73	4·58
March	4·42	4·34	4·44	4·03	4·05	4·57	5·04
April	4·35	4·21	4·26	4·10	4·42	4·41	5·21
May	4·26	4·13	4·20	4·08	4·66	4·54	5·26
June	4·23	4·15	4·27	4·34	4·98	4·55	6·53
July	4·12	4·13	4·33	4·87	4·93	4·49	6·35
August	4·08	4·11	4·45	4·84	5·02	4·48	5·62
September	4·14	4·11	4·63	5·47	5·02	4·42	5·63
October	4·26	4·23	4·77	5·07	4·99	4·07	5·71
November	4·28	4·31	4·93	4·53	4·82	4·29	6·39
December	4·34	4·25	4·95	4·55	4·52	4·41	6·61
Average	4·268	4·236	4·480	4·467	4·659	4·479	5·600

*Producers' prices for car-load quantities ex-works Montreal as furnished by Messrs. Thos. Robertson Co., Ltd ,of Montreal.

Monthly Average Prices of Lead in New York.†

(Values in cents per pound.)

Month.	1905.	1906.	1907.	1908.	1909	1910.	1911.	1912	1913.	1914.	1915.
January	4·552	5·600	6·000	3·691	4·175	4·700	4·483	4·435	4·321	4·111	3·729
February	4·450	5·464	6·000	3·725	4·018	4·613	4·440	4·026	4·325	4·048	3·827
March	4·470	5·350	6·000	3·838	3·986	4·459	4·394	4·073	4·327	3·970	4·053
April	4·500	5·404	6·000	3·993	4·168	4·376	4·412	4·200	4·381	3·810	4·221
May	4·500	5·685	6·000	4·253	4·287	4·315	4·373	4·194	4·342	3·900	4·274
June	4·500	5·750	5·760	4·466	4·350	4·343	4·435	4·392	4·325	3·900	5·932
July	4·524	5·750	5·288	4·447	4·321	4·404	4·499	4·720	4·353	3·891	5·659
August	4·665	5·750	5·250	4·580	4·363	4·400	4·500	4·569	4·624	3·875	4·656
September	4·850	5·750	4·813	4·515	4·342	4·400	4·485	5·048	4·698	3·828	4·610
October	4·850	5·750	4·750	4·351	4·341	4·400	4·265	5·071	4·402	3·528	4·600
November	5·200	5·750	4·376	4·330	4·370	4·442	4·298	4·615	4·293	3·683	5·155
December	5·422	5·900	3·658	4·213	4·560	4·500	4·450	4·303	4·047	3·800	5·355
Average	4·707	5·657	5·325	4·200	4·273	4·446	4·420	4·471	4·370	3·862	4·673

† From the *Engineering and Mining Journal*.

Average Monthly Prices of Lead in London.‡

(In £ Sterling per ton of 2,240 pounds.)

Month.	1906.			1907.			1908.			1909.			1910.		
January	16	17	6	19	16	0	14	10	6	13	3	6	13	3	11
February	16	0	4	19	11	8	14	5	6	13	5	5	13	7	3
March	15	17	0	19	14	6	14	1	4	13	8	8½	13	2	9
April	15	16	6	19	16	7	13	13	10	13	7	0	12	13	9
May	16	13	6	19	17	7	13	2	7	13	5	3	12	11	8
June	16	15	6	20	6	0	12	15	7	13	2	4	12	13	9
July	16	11	7	20	8	2	12	19	6	12	13	3	12	11	8
August	17	1	3	19	0	3	13	9	10½	12	10	6	12	10	10
September	18	4	4	19	17	6	13	3	6	12	15	3	12	12	6
October	19	7	0	18	13	0	13	7	3	13	4	4	13	2	0
November	19	5	6	17	4	11	13	12	2	13	1	4½	13	4	6
December	19	12	6	14	9	4	13	3	6	13	2	11½	13	3	9
Yearly average	17	7	0	19	1	10	13	10	5	13	1	8	12	19	0

Month.	1911.			1912.			1913.			1914.			1915.		
January	13	0	8	15	11	3	17	1	11	18	19	10	18	12	0
February	13	1	11	15	13	9	16	8	5	19	2	8	19	3	7
March	13	2	11	15	19	8	15	19	8	19	2	3	21	17	8
April	12	18	5	16	6	6	17	8	10	17	19	8	21	2	1
May	12	19	2	16	10	2	18	14	3	18	4	8	20	9	2
June	13	5	5	17	11	8	19	10	8	18	13	11	25	4	1
July	13	10	11	18	8	9	19	7	10	18	8	6	24	12	3
August	14	1	4	19	5	8	19	15	8	20	9	9	21	18	11
September	14	15	1	21	9	0	19	14	10	18	16	3	23	3	0
October	15	6	1	20	8	0	19	9	5	17	9	8	23	19	9
November	15	15	5	18	4	7	18	13	9	17	19	9	26	2	9
December	15	13	4	18	1	6	17	8	8	18	18	6	28	8	8
Yearly average	13	19	3	17	15	11	18	6	2	18	13	9	22	17	10

‡ From the *Metal Bulletin*, published in London.

Exports and Imports.—The exports of lead in 1915 amounted to 3,912,029 pounds, valued at $119,340, as against 756,673 pounds valued at $22,188 in 1914, and consisted in 1915 of pig lead 2,066,929 pounds, valued at $79,067, and lead in ore, concentrates, etc., 1,845,100 pounds, valued at $40,273.

The total exports of lead since 1873 and the detail of these exports for the last few years are given in the following tables:—

Exports of Lead, 1910 to 1915.

	Lead in ore, concentrates, etc.		Pig lead.	
	Pounds.	Value.	Pounds.	Value.
1910—To United States	46,800	$ 1,308	59,605	$ 2,295
" " Other countries			7,652,648	245,879
1911— " United States	65,100	1,826	71,961	2,806
1912— " " "	299,240	8,193		
1913— " " "	329,960	9,136		
1914— " " "	246,100	2,681	510,573	19,507
1915— " " "	1,845,100	40,273	47,540	1,494
" " Newfoundland			1,600	40
" " Other countries			2,017,789	77,533
Total for 1915	1,845,100	40,273	2,066,929	79,067

Exports of Lead, 1873 to 1915.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1873	.....	$1,993	1888	.....	$ 18	1903	18,624,303	$ 426,466
1874	.....	127	1889	.....	18	1904	25,868,823	559,461
1875	.....	7,510	1890	.....	.....	1905	41,657,403	1,046,541
1876	.....	66	1891	.....	5,000	1906	21,436,022	736,007
1877	.....	720	1892	.....	2,509	1907	25,591,883	1,029,898
1878	.....	.....	1893	.....	3,099	1908	18,454,594	622,454
1879	.....	230	1894	5,792,700	144,509	1909	17,528,028	493,642
1880	.....	.....	1895	23,075,892	435,071	1910	7,759,053	249,482
1881	.....	.....	1896	26,480,320	462,095	1911	137,061	4,632
1882	.....	32	1897	43,802,697	925,144	1912	299,240	8,193
1883	.....	5	1898	37,375,678	885,485	1913	329,960	9,136
1884	.....	36	1899	15,799,518	466,950	1914	756,673	22,188
1885	.....	.....	1900	57,642,029	1,917,690	1915	3,912,029	119,340
1886	.....	.....	1901	45,590,995	1,804,687			
1887	.....	724	1902	17,761,484	457,170			

The imports of lead in 1915 were 24,369 tons, valued at $2,482,916, as against 10,924 tons, valued at $1,042,538 in 1915. There was included herein certain manufactures of lead valued at $102,439 in 1915, and $99,285 in 1914, for which no equivalent quantity is given.

The imports of lead during 1913, 1914, and 1915, with the details of the annual imports of lead in pigs, bars, sheets, etc., since 1880, and the imports of lead manufactures, etc., are given in the following tables:—

Imports of Lead 1913, 1914, and 1915.

	1913.		1914.		1915.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Old scrap, pig and block	5,600	$464,117	7,722	$590,557	21,308	$2,010,006
Bars and sheets	747	62,527	481	41,244	456	56,331
Pipe	233	21,679	283	26,282	73	8,708
Shot and bullets	215	19,582	90	10,542	543	51,890
Manufactures of lead	.....	155,178	.....	99,285	.....	(a) 102,439
Tea lead	1,737	217,009	844	108,097	480	67,652
Litharge	500	50,734	543	52,525	790	89,232
Total	9,032	990,826	9,963	928,532	23,650	2,386,258
Metallic lead contained in imported lead pigments	1,852	224,607	961	114,006	719	96,658
	10,884	1,215,433	10,924	1,042,538	24,369	2,482,916

(a) Includes nitrate and acetate of lead in 1915.

Imports of Lead in Pigs, Bars, Sheets, etc.

Fiscal Year.	Old, scrap, and pig.		Average price.	Bars, blocks, sheets.		Average price.	Total.	
	Cwt.	Value.		Cwt.	Value.		Cwt.	Value.
1880							30,298	$124,117
1881	16,236	$ 56,919	$3.51	18,222	$70,744	$3.88	34,458	127,663
1882	36,655	120,870	3.30	10,540	35,728	3.39	47,195	156,598
1883	48,680	148,759	3.06	8,591	28,785	3.35	57,371	177,544
1884	39,409	103,413	2.62	9,704	28,458	2.93	49,113	131,871
1885	36,106	87,038	2.41	9,362	24,396	2.61	45,468	111,434
1886	39,945	110,947	2.78	9,793	28,948	2.96	49,738	139,895
1887	61,160	173,477	2.84	14,153	41,746	2.95	75,313	215,223
1888	68,678	196,845	2.87	14,957	45,900	3.06	83,635	242,745
1889	74,223	213,132	2.87	14,173	43,482	3.07	88,396	256,614
1890	101,197	283,096	2.80	19,083	59,484	3.12	120,280	342,580
1891	86,382	243,033	2.81	15,646	48,220	3.08	102,028	291,253
1892	97,375	254,384	2.61	11,299	32,368	2.86	[illegible]	286,752
1893	94,485	215,521	2.28	12,403	32,286	2.60	[illegible]	247,807
1894	70,223	149,440	2.13	8,486	20,451	2.41	78,[illegible]	[illegible]69,891
1895	67,261	139,290	2.07	6,739	16,315	2.42	[illegible]	[illegible]55,605
1896	72,433	173,162	2.39	8,575	23,169	2.70	[illegible]	196,331
1897	65,279	158,381	2.43	10,516	29,175	2.77	75,[illegible]	187,556
	Old, scrap, pig, and block.*			Bars, and sheets.†			Total.	
1898	88,420	260,779	2.95	22,214	39,041	1.76	110,634	299,820
1899	114,659	283,432	2.47	44,796	39,833	0.89	159,455	323,265
1900	62,361	207,819	3.33	15,493	53,506	3.45	77,854	251,325
1901	(a) 85,321	97,011	1.14	16,295	78,316	4.81	101,616	175,327
1902	(a) 122,279	104,672	0 86	18,596	49,261	2.65	140,875	153,933
1903	(a) 98,530	67,821	0.69	11,535	35,398	3.07	110,065	103,219
1904	(a) 94,602	121,165	1.28	14,102	39,644	2.81	108,704	160,809
1905	(a) 57,074	133,775	2.34	17,792	51,972	2.92	74,866	185,747
1906	82,729	271,105	3.28	16,106	57,185	3.55	98,835	328,290
Calendar Year.								
1907	79,673	363,655	4.56	19,177	86,338	4.50	98,850	449,993
1908	49,825	155,513	3.12	14,402	49,527	3.44	64,227	205,040
1909	112,980	184,572	1.63	13,412	44,071	3.29	126,392	228,645
1910	120,591	346,516	2.87	17,697	45,674	2.58	138,288	392,190
1911	199,774	495,923	2.48	30,837	55,458	1.80	230,611	551,381
1912	281,787	940,583	3.34	19,212	93,702	4.88	300,999	1,034,285
1913	111,995	464,117	4.14	14,944	62,527	4.18	126,939	526,644
1914	154,441	590,557	3.82	9,615	41,244	4.29	164,056	631,801
1915	426,162	2,010,006	4.72	9,125	56,331	6.17	435,287	2,066,337

*Duty 15 per cent.
†Duty 25 per cent.
(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

Imports of Lead Manufactures.

Calendar Year.	Pipe Lead.		Shot and Bullets.		Tea Lead.		Other manufactures of lead.
	Pounds.	Value.	Pounds	Value.	Pounds.	Value.	Value.
1910	403,012	$15,365	6,903	$ 311	2,371,136	$117,399	$107,688
1911	512,737	19,426	8,912	1,053	2,688,211	134,160	108,012
1912	688,383	32,423	477,047	23,163	3,212,861	167,716	144,571
1913	466,753	21,679	429,656	19,582	3,475,171	217,009	155,178
1914	565,762	26,282	180,639	10,542	1,687,029	108,097	99,285
1915	145,953	8,708	1,085,196	51,890	959,189	67,652	102,439

Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	3,041	$14,334	1893....	7,685	$24,401	1906....	10,165	$ 39,836
1881.....	6,126	22,129	1894....	38,547	28,685	Calendar Year:—		
1882.....	4,900	16,651	1895....	11,955	32,953			
1883.....	1,532	6,173	1896....	10,710	32,817	1907....	17,546	85,557
1884.....	5,235	18,132	1897....	12,028	34,538	1908....	15,524	57,929
1885.....	4,990	16,156	1898....	10,446	32,904	1909....	17,049	58,100
1886.....	4,928	16,003	1899....	9,530	32,518	1910....	15,541	56,049
1887.....	6,397	21,865	1900....	9,139	29,176	1911....	17,979	65,743
1888.....	7,010	23,808	1901....	11,132	51,944	1912....	25,925	113,941
1889.....	8,089	31,082	1902....	13,002	47,021	1913....	10,009	50,734
1890.....	9,453	31,401	1903....	13,921	47,761	1914....	10,863	52,525
1891.....	7,979	27,613	1904....	9,894	32,633	1915....	15,798	89,232
1892.....	10,384	34,343	1905....	17,865	57,736			

Imports of Dry White and Red Lead and Orange Mineral. and White Lead Ground in Oil.

Fiscal Year	Pounds.	Value.	Cents per pound.	Fiscal Year.	Pounds.	Value.	Cents per pound.
1885.....	5,540,753	$198,913	3·69	1896.....	11,711,496	$367,569	3·14
1886.....	6,703,077	213,258	3·18	1897.....	10,310,463	347,539	3·37
1887.....	6,998,820	233,725	3·34	1898.....	12,682,808	448,659	3·54
1888.....	6,361,334	216,654	3·41	1899.....	14,507,945	514,842	3·55
1889.....	7,066,·	267,236	3·78	1900.....	14,679,920	634,492	4·32
1890.....	10,859,672	381,959	3·52	1901.....	10,241,601	461,368	4·50
1891.....	8,560,615	337,407	3·94	1902.....	15,584,164	603,582	3·87
1892.....	10,288,766	351,686	3·42	1903.....	19,208,786	758,371	3·95
1893.....	10,865,183	364,680	3·36	1904.....	16,925,585	662,098	3·91
1894.....	10,958,170	353,053	3·22	1905.....	17,376,588	638,381	3·67
1895.....	8,780,052	282,353	3·22	1906.....	10,412,891	417,444	4·01

Calendar Year.	Dry White Lead.		Dry Red Lead.		Dry Red Lead and Orange Mineral.		Total Imports.		Cents per pound.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
1907.....	7,560,185	$403,941	512,473	$29,063	443,905	$30,203	8,516,563	$463,207	5·44
1908.....	2,913,799	119,860	415,606	18,429	638,518	25,367	3,967,923	163,656	4·12
1909.....	2,690,575	95,894	730,001	32,678	516,032	25,341	3,936,608	153,913	3·91
1910.....	2,076,629	75,463	811,510	37,475	881,788	31,803	3,769,927	144,741	3·84
1911.....	1,467,193	58,335	1,033,732	46,986	1,571,508	64,180	4,072,433	169,501	4·16
1912.....	2,499,725	138,627	714,362	37,916	2,539,767	113,579	5,753,854	290,122	5·04
1913.....	1,162,082	61,424	1,057,683	59,444	2,389,460	103,739	4,609,225	224,607	4·87
1914.....	363,136	20,279	546,961	31,654	1,451,264	62,073	2,361,361	114,006	4·83
1915.....	448,920	23,393	169,095	9,590	1,091,120	63,675	1,709,135	96,658	5·66

The production of lead, as already shown, was in 1915, 23,158 tons, while the exports were 1,956 tons, leaving a balance of 21,202 tons, which amount added to the 24,369 tons of imports and the manufactures, gives a total consumption of over 46,000 tons of lead, as against 29,000 tons in 1914, an increase of about 59 per cent.

The estimated consumption in 1913 was 30,000 tons; 39,000 tons in 1912; 28,000 tons in 1911, and 28,000 tons in 1910.

British Columbia.

The production of refined lead together with lead in ores exported amounted in 1915 to 45,377,064 pounds, valued at $2,541,116, as against 36,289,845 pounds, valued at $1,625,422 in 1914, an increase of 25 per cent.

According to the Provincial Department of Mines, 46,503,590 pounds of lead were contained in the lead ores shipped to the smelters for which returns had been received during 1915.

Almost all of the lead ore mined in British Columbia is smelted and refined at Trail, B.C. In 1915, however, the Surprise mine shipped its total output amounting to a considerable tonnage to the United States.

The record given in the following table for the years 1909 to 1914 inclusive represents the recovery of lead at smelter or refinery as distinguished from the figures given for the same years in the table next succeeding, which indicate the quantities of lead contained in ore sent to the smelters:—

British Columbia: Production of Lead.

Year	Pounds.	Value.	Cents per pound.	Year.	Pounds.	Value.	Cents per pound.
1887	204,800	$ 9,216	4·40	1901	51,582,906	$2,235,603	4·334
1888	674,500	29,813	4·42	1902	22,536,381	917,005	4·069
1889	165,100	6,488	3·93	1903	18,089,283	766,443	4·237
1890	Nil.	.....		1904	36,646,244	1,579,086	4·309
1891	Nil.	.....		1905	56,580,703	2,663,254	4·707
1892	808,420	33,064	4·09	1906	52,408,217	2,964,733	5·657
1893	2,131,092	79,490	3·73	1907	47,738,703	2,542,086	5·325
1894	5,703,222	187,636	3·29	1908	43,195,733	1,814,221	4·200
1895	16,461,794	531,716	3·23	1909	45,857,424	1,692,139	*3·690
1896	24,199,977	721,159	2·98	1910	32,987,508	1,216,249	*3·687
1897	38,841,135	1,390,513	3·58	1911	23,784,969	827,717	‡3·480
1898	31,693,559	1,198,017	3·78	1912	35,763,476	1,597,554	‡4·467
1899	21,862,436	977,250	4·47	1913	37,626,899	1,753,037	‡4·659
1900	62,158,621	2,760,031	4·37	1914	36,289,845	1,625,422	‡4·479
				1915	45,377,064	2,541,116	‡5,600

*Average prices at Toronto for years 1909 and 1910. For previous years average prices at New York.
‡Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

British Columbia: Production of Lead by Districts.*

(Lead contained in Ore shipped from Mines, in pounds.)

District.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Cassiar—Skeena, etc.	.....	1,695	238,578	41,512	6,579	.....	30,462
East Kootenay—							
Fort Steele	27,004,528	23,874,562	17,158,069	18,238,238	18,525,083	24,863,105	26,582,050
Other districts	18,724	66,010	.....	2,249,237	2,495,355	.....	216,327
West Kootenay—							
Ainsworth	10,298,343	2,538,353	289,009	4,863,894	9,027,861	8,069,525	3,436,184
Nelson	1,097,069	1,245,844	1,928,836	2,293,000	1,936,418	2,004,436	967,775
Slocan	4,976,199	6,406,358	6,705,571	16,944,811	22,648,766	15,233,910	14,925,345
Other districts	979,916	470,241	522,615	240,762	521,771	128,912	89,041
Yale—Grand Forks, etc.	21,567	35,683	29,719	.....	45,982	1,678	7,127
Cariboo—							
Omineca	.....	.....	.....	.....	156,862	323,482	249,279
	44,396,346	34,658,746	26,872,397	44,871,454	55,364,677	50,625,048	46,503,590

*From the Report of the Minister of Mines, B.C.

It will be noticed from the preceding table, that the Fort Steele district produced about 57 per cent of the total, Ainsworth 7 per cent, and Slocan 32 per cent.

Yukon.

During the last few years several properties have been developed and have shipped occasionally, but they have been handicapped by the high cost of development and supplies and by the heavy transportation charges.

The most important operations being conducted during 1915 were in what is known as the "Mayo area," north of the Stewart river. About 1,000 tons of very rich silver-lead ore were shipped from the Silver King property on Galena creek to the Selby smelter at San Francisco. This area is one of the most important placer gold producing districts of Yukon Territory but valuable lode deposits have also been discovered.

Dr. Cairnes of the Geological Survey reports[1] that: "The lode deposits that have been discovered within Mayo area, include mainly a rich silver-lead vein on Galena creek, and a number of gold-bearing veins on Dublin gulch. Other veins are known to occur carrying gold, silver, lead, and zinc minerals; but in most cases they have not been at all developed, and very little is known concerning them. Also on Highet creek and elsewhere, scheelite is frequently obtained in the concentrates in placer mining, indicating that deposits of this mineral occur in the vicinity. As scheelite and other tungsten ores have taken on increased val e and importance since the outbreak of the war, careful search should be prosecuted for deposits in which they occur.

"The Galena creek vein is believed to have been discovered and staked by H. W. McWhorter and partner about the year 1906, but the claim was afterwards allowed to lapse. The deposit was relocated in 1912 or 1913 by Mr. McWhorter who gave a lay on the ground to Jack Alverson and Grant Hoffman. These layees did the first real development on the property, and proved it to be of importance. They shipped 59 tons of ore to the smelter at Trail, B.C., the smelter returns for which amounted to $269 per ton, in gold, silver, and lead, the gold being very low, but the lead amounting to 45 per cent. In the spring of 1914 the property was acquired by Thomas P. Aitken and Henry Munroe, Mr. Aitken being the principal owner. During the winter of 1914–15 these owners shipped 1,180 tons of ore to San Francisco. The smelter returns for this shipment, according to a statement kindly furnished by Mr. Aitken, included $3 per ton in gold, and for about half of the ore, 39 per cent lead and 280 ounces of silver, and for the other half 23 per cent lead and 260 ounces of silver per ton.

"The cost of freighting the ore to Mayo over the snow in winter has been about $20 per ton; from Mayo to San Francisco the freight charges

[1] Summary Report, Geological Survey of Canada, 1915, pp. 27, 28.

amounted to approximately $22 per ton; and the cost of treatment there was about $20 per ton, a total of possibly slightly over $62 per ton for freight and treatment."

Bounties.—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The Act of 1903 provided for the payment, under certain restrictions, of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16, or over, per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The Act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new Act was passed in the latter year providing for further bounty payments at the rate of 75 cents per one hundred pounds, or approximately £3 10s. per ton of 2,240 pounds, subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The Act of 1908 expired in 1913, and a new Act was passed extending the bounty for a further period of five years, with the same provisions. The text of this Act and of the regulations under which the Act is administered may be consulted in the "Annual Report on Mineral Production for 1914," and previous years.

Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1916.

Year ending.	Bounty paid.	Year ending.	Bounty paid.	Year ending.	Bounty paid.
June 30, 1899	$76,665	June 30, 1906	$90,196	March 31, 1913	$68,065
" 30, 1900	43,335	March 31, 1907	1,995	" 31, 1914	8,179
" 30, 1901	30,000	" 31, 1908	51,001	" 31, 1915	340,542
" 30, 1902		" 31, 1909	307,433	" 31, 1916	59
" 30, 1903	4,380	" 31, 1910	340,542		
" 30, 1904	195,627	" 31, 1911	248,534	Total	1,979,164
" 30, 1905	330,645	" 31, 1912	179,288		

MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895 and 1897 was derived from the deposits at the western end of Kamloops lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar in a zone of decomposed Tertiary volcanic rocks.

Elsewhere in Canada mercury has been reported as also occurring in ores of the Cobalt district, and in the neighbourhood of Field, B.C., and Sechart on the west coast of Vancouver island.

The imports of mercury during the calendar year 1915, were 184,432 pounds valued at $159,184, as against 204,229 pounds, valued at $97,449 in 1914.

The following tables give the production of mercury in Canada and the imports since 1882, also the average monthly price for the last two years in New York, San Francisco, and London:—

Production of Mercury.

Calendar Year.	Flasks.*	Price per flask.	Value.
1895	71	$33.00	$2,343
1896	58	33.44	1,940
1897	9	36.00	324

* Seventy-six and one half (76½) pounds each.

Imports of Mercury.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1882	2,443	$ 965	1894	36,914	$ 14,483	1906	150,364	$69,505
1883	7,410	2,991	1895	63,732	25,703	Calendar Year.		
1884	5,848	2,441	1896	77,869	32,353	1907	189,841	82,873
1885	14,490	4,781	1897	76,058	33,534	1908	87,620	44,030
1886	13,316	7,142	1898	59,759	36,425	1909	285,958	147,625
1887	18,409	10,618	1899	103,017	51,695	1910	107,888	63,450
1888	27,951	14,943	1900	85,342	51,987	1911	118,336	67,416
1889	22,931	11,844	1901	140,610	94,564	1912	137,474	72,171
1890	15,912	7,677	1902	97,283	56,615	1913	219,442	109,493
1891	29,775	20,223	1903	164,968	91,625	1914	204,229	97,449
1892	30,936	15,038	1904	151,107	80,658	1915*	184,432	159,184
1893	50,711	22,998	1905	103,330	48,412			

*Duty free.

Average Monthly price of Mercury.

(Per Flask of 75 pounds).

Month.	1914.			1915.		
	New York.	SanFrancisco.	London.	New York.	SanFrancisco.	London.
January	$38.75	$38.63	£ 7.50	$51.60	$50.80	£ 11.35
February	39.00	38.50	7.50	59.38	58.00	12.28
March	38.60	38.30	7.30	73.13	62.16	12.50
April	38.00	38.00	7.00	71.50	64.31	12.44
May	37.90	37.60	7.00	77.20	67.50	11.80
June	38.00	37.13	7.00	95.63	88.13	15.13
July	36.75	36.50	6.75	95.50	92.50	17.94
August	83.00	90.00	.....	92.50	89.25	18.15
September	74.38	74.00	.....	89.50	88.00	16.50
October	53.75	53.50	.....	94.70	90.80	15.90
November	50.30	51.00	.....	108.13	102.00	16.38
December	51.25	51.00	.....	135.00	121.25	16.63
Year	$48.31	$48.68	.....	$ 87.01	$ 81.23	£14.75

MOLYBDENUM.

The commercial production of molybdenum ore in Canada has been practically negligible, nevertheless the mineral has bee.. found in numerous localities and in many of these in sufficient quantity to make its possible recovery a question of considerable interest, an interest which doubtless has been greatly stimulated by the high price which the ore, concentrated to 85 or 90 per cent molybdenite (MoS_2), has commanded.

During 1913, 1914, and 1915 some work was done on a number of properties in Ontario, Quebec, and British Columbia.

The total shipments in the form of molybdenite, were in 1915, 29,210 pounds, valued at $28,450, as against 3,814 pounds, valued at $2,063, in 1914. This production came from Ontario and British Columbia.

In 1902 about 6,500 pounds of molybdenum ore, valued at $400 were reported as having been taken from a deposit in the township of Laxton, county of Victoria, Ontario, by John Webber, of Toronto.

In 1903, Mr. A. M. Chisholm, of Kingston, reported the shipment to the United States, and elsewhere, of 85 tons of molybdenum ore valued at $1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concessic XIV, Sheffield township, Addington county, Ontario.

Quebec.—During 1915, some development work was done by the Aldfield Mineral Syndicate on their property in Aldfield township, Pontiac county, and by the Height of Land Mining Co., in Preissac township, near Kewagama lake, Timiskaming.

Ontario.—The Algunican Development Co. Ltd., did some development at Mount St. Patrick, Brougham township, Renfrew county. W. J. Spain was operating in the same district and shipped some ore during the year—he has a mill under construction.

A. M. Chisholm has been operating his property in Sheffield township, county of Addington, and shipped several tons to the Mines Branch Ore Dressing and Metallurgical laboratories at Ottawa.

The Orillia Molybdenum Co. Ltd., have operated their property in Renfrew county and have treated with their ore, some custom ores from the district. This Company has established at Orillia, Ont., a plant for the treatment of molybdenite ores and has marketed both concentrates and refined products.

British Columbia.—The molybdenite claims on Lost creek, 14 miles from Salmo, were owned by Messrs. Ross, Bennett and Benson, and have been operated under lease by M. A. Merrill, of Vancouver. The shipments in 1915 amounted to about 5,910 pounds of molybdenite contained in ore.

The Provincial Mineralogist reports that: "The actual output of molybdenite during the year was confined to a shipment from the Molly

group, on Lost creek, in the Nelson Mining Division, which was sent to the Henry E. Woods Ore Concentrating Company, Denver, Colorado; this shipment amounted to 24 tons and contained by assay 12·26 per cent of molybdenite. Some development work was done on the property and it is now under lease and bond to a Vancouver syndicate, which intends to erect in the spring a small concentrator. The market requirements are such that a molybdenite ore must be concentrated up to 85 or 90 per cent molybdenite (MoS_2) before it is marketable. The Lost Creek property has several thousand tons of from 2 to 4 per cent ore, so that, with a suitable mill, a small production could be maintained."

"Another property, on Alice arm, in the Skeena Mining Division controlled by J. D. Ross, of Seattle, is reported to have a large showing of molybdenite, and it is said that a mill is being erected on it which will soon be producing a ton a day of high-grade concentrates. Other prospects in the Nelson, Kamloops and Lillooet Mining Divisions showing some molybdenite have been investigated, but as yet none of them have assumed any great importance."

Prices.—There has been a small annual production of molybdenite in Australia since 1900 and previous to 1914 the price varied generally between $400 and $600 per ton for ore containing a minimum of 85 per cent MoS_2.

In January of 1914 according to the "Engineering and Mining Journal, of New York, "Such ore would be worth from $8 to $10 per unit, providing the ore be free from copper, arsenic, bismuth and tungsten. Any one of these elements will reduce the price of the ore. For instance: 90 per cent ore free from these elements is at present worth $12.50 per unit, practically twice the price of tungsten ore. Lower grade ores are worth much less."

During December 1914 as high as 135s. per unit was quoted (— £607 per gross ton or $1.32 per pound for 90 per cent ore).

"In the early part of 1915 the inquiry for Molybdenum products dropped to practically nothing, the sudden demand in the last quarter of 1914 proving to be but a temporary interest.

"The demand, however, caused molybdenum to be prospected for as never before, with the natural result that molybdenum ores are offered very freely, with practically no demand at the present time."*

Molybdenite ore containing 85 to 90 per cent molybdenum was worth towards the close of 1915 from $2,500 to $3,000 delivered in New York.

Early in 1915 the export of molybdenite to foreign destinations was prohibited except under license. Since September of 1915 the Imperial Government has requisitioned all supplies of molybdenite arriving in the United Kingdom at the price of five pounds, five shillings (105s.) per unit, cost, insurance and freight or ex. warehouse, on the basis of 90 per cent MoS_2, less one per cent brokerage charges. Subsequently the basis was

*From the *Engineering and Mining Journal*, January 8, 1916.

reduced to a minimum of 85 per cent MoS_2. The firms of H. H. Watson & Co., Liverpool, was appointed by His Majesty's Government to act as brokers for the purchase of these ores. At a later date the Imperial Munitions Board at Ottawa was authorized to purchase molybdenite ores in Canada.

A special report[1] describing the principal Canadian molybdenite occurrences discovered prior to 1910 has been published by the Mines Branch. The department through its ore testing division has also undertaken an investigation of the concentration of these ores, and a preliminary report[2] has already been published in the Summary Report of the Mines Branch for 1913.

The following firms are believed to be purchasers of molybdenite: The Electro Metallurgical Company of America, New York; Primos Chemical Company, Primos, Penn.; DeGobia and Atkins, San Francisco, Cal.; Geo. G. Blackwood, Sons & Co.; The Albany, Liverpool, England; W. C. Willis & Co., 90 Mitchell St., Glasgow; J. Cameron, Swan & Co., 4 St. Nicholas Bldgs., Newcastle-on-Tyne, England; Sir A. G. Armstrong, Whitworth & Co., 8 Great George St., Westminster, London, England.

The annual production of molybdenite in Australia (Queensland and New South Wales) is shown in the accompanying table:—

Annual Production of Molybdenite in Australia.

Year.	Queensland (a).		New South Wales (b).	
	Long tons.	£	Long tons.	£
1900	11·00	561	.....	.....
1901	*26·00	1,609	.....	.....
1902	*41·00	5,502	15·00	1,841
1903	*24·00	2,100	29·00	4,458
1904	21·65	2,746	25·25	2,726
1905	*84·75	10,454	19·40	2,507
1906	*129·15	17,034	32·65	4,798
1907	*17·15	9,660	21·65	3,564
1908	*168·85	14,686	.....	.....
1909	*156·75	13,820	.....	.....
1910	*139·90	16,914	.....	.....
1911	*228·50	24,842	.....	.....
1912	*197·50	19,261	56·55	3,706
1913	66·00	.....	78·80	6,802
1914 (c)	78·00	38,190	61·00	11,451
1915	(d) 97·00	.....	.....	(e) 16,937

(a) From the Annual Report of the Dept. of Mines, New South Wales.
(b) From the Annual Report of the Under Secretary for Mines, Queensland.
(c) From the Annual Report of the Dept. of Mines of Western Australia.
(d) From the "London Mining Journal," June 10, 1916.
(e) From the "London Mining Journal," May 13, 1916.
* Includes bismuth and wolfram.

[1] No. 93, "Report on the Molybdenum Ores of Canada," by T. L. Walker, Ph. D., Mines Branch, Department of Mines, Ottawa, 1911.
[2] No. 285, "Summary Report, Mines Branch, Department of Mines," 1913, pp. 66–71.

NICKEL.

The industry based on the mining and metallurgical treatment of the nickel-copper ores of the Sudbury district, Ontario, ranks among the most important of Canada. Not only is there a considerable production of copper but the nickel, which is the important product, supplies a very large proportion of the world's consumption of the metal.

The past few years' development has very largely increased the known ore reserves of the district. These nickel-copper deposits have been the subject of special reports by the Mines Branch and Geological Survey at Ottawa, and by the Ontario Bureau of Mines, Toronto.*

The production of nickel in 1915 amounted to 68,308,657 pounds, valued at $20,492,597, as compared with 45,517,937 pounds valued at $13,655,381 in 1914, an increase of 50·7 per cent, and was by far the highest on record.

There were mined in 1915, 1,364,048 tons of ore, and smelted 1,272,283 tons, from which were produced 67,703 tons of Bessemer matte, carrying approximately 34,039 tons of nickel and 19,608 tons of copper. The net value of the matte, as reported by the operators was $10,352,344 which is based on an average value of 7·2 cents per pound for copper, and 11·1 cents per pound for the nickel.

The average metal recovery in matte from the ores treated was 1·541 per cent copper and 2·675 per cent nickel.

The nickel-copper ore is reduced in smelters and converters to a Bessemer matte containing from 77 to 82 per cent of the combined metals, having averaged for the past year 50·3 per cent nickel and 29·0 per cent copper, as against 49·0 per cent nickel and 31·1 per cent copper in 1914, and 52·7 per cent nickel and 27·4 per cent copper in 1913.

For the production of monel metal, a special matte is produced with contents of about 22 per cent copper and 58 per cent nickel, which is included in the total given above. Monel metal is produced directly from this matte without the intermediate refining of either the nickel or the copper.

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* Report on Nickel and Copper Deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey, Canada. No. 873, 1901.
The Sudbury Nickel Region, by A. P. Coleman, Ph.D., Bureau of Mines, Vol. XIV, Part II, 1904.
The Nickel Inuustry, with special reference to the Sudbury Region, Ont. Report by A. P. Coleman Ph.D., Mines Branch, Ottawa, No. 170, 1913.

The following are the aggregate results of the production and treatment of nickel-copper ores in Ontario during the past four years, with also the annual production of nickel since 1889:—

Production of Nickel.

		1912.	1913.	1914.	1915.
Ore mined	Short tons.	737,726	784,697	1,000,364	1,364,048
Ore smelted	"	725,065	823,403	947,053	1,272,283
Bessemer matte produced	"	41,925	47,150	46,396	67,703
Copper content of matte	"	11,116	12,938	14,448	19,609
Nickel "	"	22,421	24,838	22,759	34,039
Spot value of matte		$6,303,102	$7,076,945	$7,189,031	$10,352,744
Wages paid miners and smelters		$2,626,609	$3,291,956	$3,096,911	$3,555,912
Men employed		3,110	3,486	3,379	4,633

Annual Production of Nickel.

Calendar Year.	Pounds of nickel in matte shipped.	Cents per pound.	Value.	Calendar Year.	Pounds of nickel in matte shipped.	Cents per pound.	Value.
1889 (a)	830,477	60	$ 498,286	1902	10,693,410	47	$5,025,903
1890	1,435,742	65	933,232	1903	12,908,510	40	5,002,204
1891	4,035,347	60	2,421,208	1904	10,547,883	40	4,219,153
1892	2,413,717	58	1,399,956	1905	18,876,315	40	7,550,526
1893	3,982,982	52	2,071,151	1906	21,490,955	42	8,948,834
1894	4,907,430	38½	1,870,958	1907	21,189,703	45	9,535,407
1895	3,888,525	35	1,360,984	1908	19,143,111	43	8,231,538
1896	3,397,113	35	1,188,990	1909	26,482,991	36	9,461,877
1897	3,997,647	35	1,399,176	1910	37,271,033	30	11,181,310
1898	5,517,690	33	1,820,838	1911	34,098,744	30	10,229,623
1899	5,744,000	36	2,067,840	1912	44,841,542	30	13,452,463
1900	7,080,227	47	3,327,707	1913	49,676,772	30	14,903,032
1901	9,189,047	50	4,594,523	1914	45,517,937	30	13,655,381
				1915	68,308,657	30	20,492,597

(a) Calculated from shipments made by rail.

Refined metallic nickel is now being recovered in Canadian refineries but only in small quantities and as a by-product in the smelting and refining of the silver-cobalt-nickel ores, nickel oxide having been recovered in these smelters for several years. The recovery of nickel-sulphate was also reported for the first time in 1915. A considerable amount of nickel is probably contained in ores exported for smelting for which no payment is received by the mines shipping and the amount finally recovered is impossible to ascertain.

The production of metallic nickel during 1915 was reported as 55,325 pounds, valued at $22,130, and nickel-oxide and nickel-sulphate 282,025 pounds valued at $31,262.

The total nickel content of recoveries from silver-cobalt-nickel ores was 231,634 pounds.[1]

[1] See chapter on "Cobalt."

The production of nickel-oxide during 1914 was 392,512 pounds.

The companies engaged in mining and smelting nickel ores are: The Canadian Copper Company, subsidiary to the International Nickel Company, with smelter at Copper Cliff, Ontario, and refinery at Bayonne, New Jersey; the Mond Nickel Company, Coniston, of London, England, with smelter at Coniston, Ontario, and refinery at Clydach, Swansea, Wales. The Alexo mine, on the Porcupine Branch of the Timiskaming and Northern Ontario Railway, was again a producer, shipping nickel-copper ore to the Mond smelter at Coniston. The Sudbury Leasing and Development Co. of Sudbury, was also shipping ore to the Coniston smelter.

Prices.—The price of refined nickel in New York remained fairly constant during the first seven months of the year 1915, quotations published by the Engineering and Mining Journal being 40 to 45 cents per pound for ordinary forms with 5 cents per pound more asked for electrolytic nickel. During the last five months of the year prices ranged between 45 and 50 cents for ordinary forms.

The price during 1914 was quoted at 45 cents per pound for nickel shot, blocks or plaquettes, and electrolytic nickel 5 cents higher per pound.

The price of nickel in Europe in 1915, as given by the "London Mining Journal," was quoted between £186 and £206 (40·4 to 44·7) cents per pound) from January 1st, until the end of May, when it rose to £210, and gradually increased until it reached in the last week in July a quotation of £225 per long ton (48·8 cents per pound) and remained at that price until the close of the year.

Exports and Imports.—The exports in 1915 amounted to 66,410,442 pounds of which 13,747,991 pounds, or 20·7 per cent went to Great Britain, and 52,662,451 pounds, or 79·3 per cent to the United States.

In 1914, 22·1 per cent of the total exports went to Great Britain and 77·4 per cent to the United States.

The exports of nickel to Great Britain in 1914, were almost double those of 1913 and there was a further increase in 1915. The exports to the United States which had fallen off nearly 20 per cent in 1914 showed an increase in 1915 of over 46 per cent.

The exports by countries during the past four years and the annual exports since 1890 are shown in the accompanying tables:-

Destination.		1912.	1913.	1914.	1915.
To Great Britain	Pounds.	5,072,867	5,164,512	10,291,979	13,747,991
To United States	"	39,148,993	44,224,119	36,015,642	52,662,451
To other countries	"	.....	70,386	220,706	.....
Total		44,221,860	49,459,017	46,528,327	66,410,442

Exports of Nickel Contained in Ore, Matte, or Other Product.

Calendar Year.	Value.	Calendar Year.	Pounds.	Value.	Cents per pound.
1890	$ 89,568	1903	12,699,227	$1,116,099	8·78
1891	667,280	1904	11,233,869	1,091,349	9·71
1892	293,149	1905	17,318,059	1,569,693	9·06
1893	629,692	1906	20,653,845	2,042,965	9·89
1894	559,356	1907	19,376,335	2,280,374	11·76
1895	521,783	1908	19,419,893	1,866,624	9·61
1896	658,213	1909	25,616,398	2,676,483	10·45
1897	723,130	1910	36,014,782	4,030,040	11·19
1898	1,019,363	1911	32,619,971	3,676,396	11·27
1899	939,915	1912	44,221,860	4,661,758	10·54
1900	1,031,030	1913	49,459,017	5,195,560	10·50
1901	751,080	1914	46,528,327	5,149,427	11·07
1902	1,007,211	1915	66,410,442	7,394,446	11·13

The imports of nickel are classed with those of nickel-silver and German silver and manufactures of these metals. There is also a considerable import of nickel-plated ware.

The imports in 1915 consisted of nickel in ingots, bars, sheets, etc., to the amount of 710,344 pounds, valued at $197,168, and manufactures of nickel, valued at $77,538.

The imports of nickel, nickel-silver, German silver, etc., during 1914 and 1915 have been as follows:—

Imports of Nickel, Nickel-Silver, and German Silver, 1914 and 1915.

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
Nickel, nickel-silver, and German silver in ingots or blocks	70,564	$ 25,362	635,963	$169,807
Nickel, nickel-silver, and German silver in bars and rods and also in strips, sheets or plates	549,288	130,065	74,381	27,361
Manufactures of German, Nevada, and nickel-silver, not plated		83,185		77,538

In view of the large export of nickel from Canada to the United States and its refinement in that country, a record of the imports into, and exports of nickel from the United States, may be of special interest and is shown below as compiled from the "Foreign Commerce of the United States."

The values of the United States exports ranged from 34 to 43 cents per pound, with an average of 38 cents in 1915, as against 32 to 39 cents per pound and an average of 34 cents per pound in 1914.

The imports and exports from the United States for the calendar years 1914 and 1915, and for the fiscal years 1910–1915 are given in the following tables:—

United States: Imports and Exports of Nickel.*

	1914.			1915.		
	Quantity.	Value.	Cents per pound.	Quantity.	Value.	Cents per pound
Imports into United States—						
Ore and matte.....Gross tons	29,564	$4,956,448	13·77	45,798	$7,615,999	13·52
Nickel content.....Pounds.	36,006,700			56,352,582		
Exports from United States—						
To France.....Pounds.	3,457,157	1,203,370	34·80	3,018,354	1,124,382	37.25
" Netherlands..... "	855,168	332,057	38·83	129,557	55,954	43·29
" United Kingdom. "	10,836,369	3,861,913	35·64	14,801,565	5,317,532	35·92
" Other countries... "	12,446,458	4,058,188	32·60	8,469,074	3,540,646	41·80
Totals.....	27,595,152	9,455,528	34·26	26,418,550	10,038,514	38·00

Imports of Nickel Ore and Matte into the United States during the following fiscal years ending June:—*

From:		1910.	1911.	1912.	1913.	1914.	1915.
Belgium.....	Tons.	.....	91	1,078	1,371	1,243	242
	Pounds.	.....	146,656	1,587,598	2,498,262	2,037,008	317,971
Norway.....	Tons.	.....	.....	.....	.....	3	366
	Pounds.	.....	.....	.....	.....	5,040	530,704
Canada.....	Tons.	22,470	24,072	26,373	35,597	35,174	29,592
	Pounds.	27,619,601	29,805,590	32,414,454	(a)45,010,108	(b) 41,507,255	(c) 36,607,235
Oceania—French....	Tons.	3,000	.....	.....	.....	.....	.....
	Pounds.	376,724	.....	.....	.....	.....	.....
" Australia..	Tons.	.....	.....	.....	.....	.....	601
	Pounds.	.....	.....	.....	.....	.....	539,109
Totals.....	Tons.	25,470	24,163	27,451	36,968	36,420	30,801
	Pounds.	27,996,325	29,952,246	34,002,052	47,508,370	43,549,303	37,995,019

(a) Value, $5,825,642. (b) Value, $5,621,480. (c) Value, $4,788,145.

* From the "Foreign Commerce of the United States, Dec., 1915.

Exports of Nickel, Nickel Oxide and Matte from the United States during the following fiscal years, ending June:*

To	1910.	1911.	1912.	1913.	1914.	1915.
Austria-Hungary.....Pounds.				134,400	672,043	67,200
Belgium..... "	436,953		551,740	1,719,285	1,230,274	210,612
Denmark..... "						43,830
France..... "	1,212,539	3,765,510	5,579,335	4,197,110	4,419,663	3,210,980
Germany..... "	548,589	1,902,393	2,527,273	2,346,325	11,084,366	1,036,242
Italy..... "	546,983	4,938	1,321,733	1,075,303	1,276,905	2,365,177
Netherlands..... "	7,166,322	8,205,836	7,584,653	9,164,012	2,376,216	22,033
Norway..... "						31,158
Russia in Europe..... "	3,200			7,250	186,626	4,082,280
Spain..... "						700
Sweden..... "						367,696
U. Kingdom:—						
England..... "	2,497,430	1,342,714	3,019,833	2,334,845	2,171,511	8,535,418
Scotland..... "	1,189,694	3,114,166	5,970,045	6,878,264	5,433,081	7,817,384
N. America:—						
Canada..... "	47,091	8,926	3,373	16,379	42,529	52,949
Mexico..... "		40				1,779
W. Indies (Brit.)... "						300
S. America:—						
Argentina..... "	2,339					
Brazil..... "				1,796		
Columbia..... "				32		
Asia:—						
Japan..... "		1,957	4,005	5,447	2,028	308,444
Russia in Asia..... "						1,423,030
Oceania:—						
Brit. Australia and Tasmania..... "	1,267	1,330		829		22,400
	13,652,407	18,947,810	26,561,990	27,881,277	28,895,242	29,599,612

*From Reports on the commerce and navigation of the United States, Department of Commerce, Washington, D.C.

Bounty on Refined Nickel and Nickelo-xide.—Under the terms of "The Metal Refining Act, 1907," of the Province of Ontario (7 Edward VII, Chap. XIV) a bounty is authorized to be paid on nickel, cobalt, copper, and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907). In March, 1912, the Act was amended to cover a further period of five years.

The sections affecting nickel are as follows:—

"The Treasurer of the Province may under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant Governor in Council pay in each year to the refiners of the metals or metal compounds hereinafter specified when refined in the Province from ores raised and mined in the Province, a bounty on each pound of such metal or compound so refined, as follows":—

"Class 1. On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel-oxide, but nickel on which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form, and the amount to be paid as bounty on the nickel products therein mentioned is not to exceed in all $60,000 in any one year."

PLATINUM AND PALLADIUM.

In past years the chief source of the platinum production of Canada was the placer gravels of British Columbia, principally in the Similkameen district.

During 1915 there was much activity in the Similkameen and Tulameen districts, and the reported recovery of platinum was 23 crude ounces, valued at $1,063.

The United States Department of Commerce reports the importation into the United States from Canada during 1915 of 100 ounces of platinum, and the Canadian Department of Customs reports the exports from Canada of 236 ounces of platinum, valued at $11,052. There is a possibility that the Canadian export recorded may include old and scrap platinum. However it is equally possible that the production of platinum may be considerably greater than that actually reported.

One or two companies operating in the Quesnel River district in 1914, reported small quantities of platinum with placer gold but the information was not sufficiently definite for record.

During 1913 operators in the Cariboo district of British Columbia reported a recovery of 18 crude ounces of platinum valued at $489.

Statistics of the annual production of platinum and palladium are given in the following tables:—

Annual Production of Platinum.

Year.	Value.	Year.	Value.	Year.	Crude ounces.	Value.
1887	$ 5,600	1895	$ 3,800	1903		$ 33,345
1888	6,000	1896	750	1904		10,872
1889	3,500	1897	1,600	1905		500
1890	4,500	1898	1,500	1906		*
1891	10,000	1899	825	1907–1912		**
1892	3,500	1900	Nil.	1913	18	489
1893	1,800	1901	457	1914		
1894	900	1902	46,502	1915	23	1,063

*See under Palladium.
**See explanation in text.

Annual Production of Palladium.

	Ounces.	Value.
1902 Palladium	4,411	$86,014
1903 "	3,177	61,952
1904 "	952	18,564
1905 Metals of the platinum group	1,562	28,116
1906 " "	314	5,652
1907–1915	(a)	.....

(a) See explanation in text.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and since 1902 considerable quantities of these metals have been recovered from the residues resulting from the treatment of the mattes from Sudbury.

The recovery of gold, silver, platinum, and palladium at the works of the International Nickel Company in New Jersey for the six years ending December 31, 1912, was as follows:—

Year.	Gold.	Silver.	Platinum.	Palladium.
1907 ..... Ounces.	993·572	63,400·70	226·800	607·300
1908 ..... "	5,238·181	139,329·29	172·316	382·287
1909 ..... "	2,113·669	63,138·66	546·627	1,270·598
1910 ..... "	2,649·799	60,256·83	258·325	522·804
1911 ..... "	2,203·052	70,954·38	665·552	753·363
1912 ..... "	2,476,558	62,169·66	496·850	680·130
	15,674·831	459,249·52	2,366·470	4,216·482

In view, however, of the fact that other material has been treated in the Company's works in addition to the nickel-copper mattes from Copper Cliff, Ontario, it is impossible to state what proportion of the above recoveries was from Canadian sources, although, it is, of course, safe to assume that part of these metals has been derived from the Sudbury District mattes. The Company reported there had been no production in 1913, 1914, or 1915 from Canadian ores.

The average monthly price of refined platinum in New York fell from $41.10 per ounce in January to $38.00 in June and July, but increased rapidly during the last five months of the year to an average of $85.50 in December.

The average monthly prices during 1914 and 1915 and the average yearly prices since 1910 are given in the following tables:—

Average Monthly Prices of Platinum, 1914 and 1915.*

(In dollars per ounce Troy).

Month.	1914.			1915.		
	New-York refined Platinum.	St. Petersburg 83%.	Ekaterinburg crude meta Platinum.	New-York refined Platinum	St. Petersburg 83%.	Ekraterinburg crude metal Platinum.
January	43.38	36.43	36.28	41.10	.....	.....
February	43.50	36.36	36.28	40.00	30.38	30.08
March	43.50	36.39	36.28	39.50	30.38	30.08
April	43.50	36.46	36.28	38.63	30.38	30.08
May	43.50	36.41	36.28	38.50	30.57	30.08
June	43.50	36.09	36.00	38.00	32.39	31.02
July	43.50	35.72	35.72	38.00	32.39	31.02
August	50.20	.....	.....	39.25	32.30	30.73
September	50.00	.....	35.72	50.00	.....	.....
October	49.50	.....	37.84	54.50	37.98	38.70
November	45.45	.....	.....	62.63	47.46	46.64
December	42.19	.....	.....	85.50	56.40	56.25
Year	45.14	.....	.....	47.13	.....	.....

* From the "Engineering and Mining Journal."

Average Yearly Prices of Platinum.*

(In dollars per ounce troy).

	1910.	1911.	1912.	1913.	1914.	1915.
New York refined platinum	32.70	43.12	45.55	44.88	45.14	47.13
St. Petersburg, Russia, 83%	26.96	35.21	37.08	36.54	.....	.....
Ekaterinburg crude metal platinum	26.37	35.09	37.05	36.25	.....	.....

*From quotation in Engineering and Mining Journal, p. 47, January 8,1916.

Statistics of the annual imports of platinum since 1883 are given in the following table:—

Imports of Platinum.*

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1883	$ 113	1889	$ 3,167	1895	$ 3,937	1901	$20,263
1884	576	1890	5,215	1896	6,185	1902	19,357
1885	792	1891	4,055	1897	9,031	1903	21,251
1886	1,154	1892	1,952	1898	9,781	1904	28,112
1887	1,422	1893	14,082	1899	9,671	1905	61,719
1888	13,475	1894	7,151	1900	57,910	1906	54,494

Calendar Year.	Crucibles.	Wire and bars, strips, sheets, or plates.	Retorts, pans, condensers, etc.	Total Imports.
	Value.	Value.	Value.	Value.
1907	$2,974	$89,719	$3,415	$96,108
1908	1,709	37,223	5,321	44,253
1909	3,617	61,441	9,432	74,590
1910	2,133	100,185	10,744	113,062
1911	4,549	170,944	.....	175,493
1912	7,874	224,216	73	232,163
1913	4,557	141,117	.....	145,674
1914	9,795	69,736	142	79,673
1915	5,147	65,040	13,900	84,087

*Platinum wire and platinum in bars, strips, sheets or plates; platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works; crucibles. Duty free.

SILVER.

In 1915 the total production of silver, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was 26,625,960 fine ounces, valued at $13,228,842, as compared with 28,449,821 fine ounces, valued at $15,593,630 in 1914, showing a falling off of 1,823,861 fine ounces or 6·4 per cent in quantity, and $2,364,788, or 15·1 per cent in value. The production of 1914 had shown a falling off of 10·6 per cent in quantity and 18·2 per cent in value, from that of 1913.

Of the total production in 1915, 21,573,844 ounces, or 81 per cent, was in the form of refined silver, or silver contained in silver and gold bullion; 688,811 ounces, or 2·6 per cent was contained in blister copper and copper matte produced, and 4,363,305 ounces, or 16·4 per cent was estimated as recoverable from ores exported.

From 1887 to 1893 th production ranged in value between $300,000 and $400,000, and was derived chiefly from Ontario and Quebec. The next three years saw a rapid increase in production, due to the development of the silver-lead deposits of British Columbia, and in 1896 a production of over $2,000,000 is recorded. From that year until 1905 the production varied between $2,000,000 and $3,500,000 rising rapidly during the next six years to $17,580,455 in 1910, as a result of the discovery of the rich ores of the Cobalt district. Since then, there has been a falling off in quantity, but owing to the higher price of the metal, the total value was higher in 1912 and 1913.

Statistics of the annual production of silver since 1887 are given in the following table:—

Annual Production of Silver 1887-1915

Year.	Ounces.	Value.	Cents per ounce.	Year.	Ounces.	Value.	Cents per ounce.
1887	355,083	$ 347,271	98·00	1901	5,539,192	$3,265,354	58·95
1888	437,232	410,998	94·00	1902	4,291,317	2,238,351	52·16
1889	383,318	358,785	93·60	1903	3,198,581	1,709,642	53·45
1890	400,687	419,118	104·60	1904	3,577,526	2,047,095	57·22
1891	414,523	409,549	98·00	1905	6,000,023	3,621,133	60·35
1892	310,651	272,130	86·00	1906	8,473,379	5,659,455	66·79
1893	.....	330,128	77·00	1907	12,779,799	8,348,659	65·33
1894	847,697	534,049	63·00	1908	22,106,233	11,686,239	52·86
1895	1,578,275	1,030,299	65·28	1909	27,529,473	14,178,504	51·50
1896	3,205,343	2,149,503	67·06	1910	32,869,264	17,580,455	53·49
1897	5,558,456	3,323,395	59·79	1911	32,559,044	17,355,272	53·30
1898	4,452,333	2,593,929	58·26	1912	31,955,560	19,440,165	60·83
1899	3,411,644	2,032,658	59·58	1913	31,845,803	19,040,924	59·79
1900	4,468,225	2,740,362	61·33	1914	28,449,821	15,593,630	54·81
				1915	26,625,960	13,228,842	49·68

Ontario produced in 1905, 40·9 per cent of the output of Canada, in 1911 its percentage was 93·8; in 1914 it had fallen to 88·4 per cent, and in 1915 it decreased again to 85·4 per cent.

The production of British Columbia, which has varied between two and five million ounces for the last twenty years, was in 1914, 11·1 per cent of the total production of Canada, and in 1915 it increased to 13·4 per cent.

Quebec, and the Yukon, have produced but a small proportion of the total, being in 1915, 0·3 per cent for Quebec, and 0·9 per cent for the Yukon.

Statistics of the silver production by provinces since 1887, are given in the following table:—

Production of Silver by Provinces, 1887-1915.

Year.	Ontario.		Quebec.		British Columbia.		Yukon Territory.	
	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.
1887	190,495	$ 186,304	146,898	$143,666	17,690	$ 17,301	.....	.....
1888	208,064	195,580	149,388	140,425	79,780	74,993	.....	.....
1889	181,609	169,986	148,517	139,012	53,192	49,787	.....	.....
1890	158,715	166,016	171,545	179,436	70,427	73,666	.....	.....
1891	225,633	222,926	185,584	183,357	3,306	3,266	.....	.....
1892	41,581	36,425	191,910	168,113	77,160	67,592	.....	.....
1893	.....	8,689	.....	126,439	.....	195,000	.....	.....
1894	.....	.....	101,318	63,830	746,379	470,219	.....	.....
1895	.....	.....	81,753	53,369	1,496,522	976,930	.....	.....
1896	.....	.....	70,000	46,942	3,135,343	2,102,561	.....	.....
1897	5,000	2,990	80,475	48,116	5,472,971	3,272,289	.....	.....
1898	85,000	49,521	74,932	43,655	4,292,401	2,500,753	.....	.....
1899	202,000	120,352	40,231	23,970	2,939,413	1,751,302	230,000	$137,034
1900	161,650	99,140	58,400	35,817	3,958,175	2,427,548	290,000	177,857
1901	151,400	89,250	41,459	24,440	5,151,333	3,036,711	195,000	114,953
1902	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,985
1903	17,777	9,502	28,600	15,287	2,996,204	1,601,471	156,000	83,362
1904	206,875	118,376	15,000	8,583	3,222,481	1,843,935	133,170	76,201
1905	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54,093
1906	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42,522
1907	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908	19,398,545	10,254,847	13,299	7,030	2,631,389	1,391,058	63,000	33,304
1909	24,822,099	12,784,126	13,233	6,815	2,649,141	1,364,387	45,000	23,176
1910	30,366,366	16,241,755	7,593	4,061	2,407,887	1,287,883	87,418	46,756
1911	30,540,754	16,279,443	18,435	9,827	1,887,147	1,005,924	112,708	60,078
1912	29,214,025	17,772,352	9,465	5,758	2,651,002	1,612,737	81,068	49,318
1913	28,411,261	16,987,377	34,573	20,672	3,312,343	1,980,483	87,626	52,392
1914	25,139,214	13,779,055	57,737	31,646	3,159,897	1,731,971	92,973	50,959
1915	22,748,609	11,302,419	63,450	31,524	3,565,852	1,771,658	248,049	123,241

Prices.—The average monthly price of silver in New York, which was 48¾ cents for the first week of January, increased to 51 cents for the first week of March, then decreased to a minimum of 46¼ cents for the last week of July, increasing again to a maximum of 56⅛ cents for the last week of November, and the year ended with silver at 54¾ cents per fine ounce.

The average for the year was 49·684 cents, as against 54·811 cents in 1914, and 59·791 cents in 1913.

In London the minimum weekly average was 22⅛ pence per standard ounce 0·925 fine in the last week in July, and the maximum was 36 15/16 pence in the last week of November, with an average for the year of 23·675 pence, as against 25·315 pence in 1914.

The average monthly prices of silver in New York from 1910 to 1915 and in London during 1915, are shown in tabulated form following:—

Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.						London—Pence per Standard ounce (a).
	1910.	1911.	1912.	1913.	1914.	1915.	1915.
January	52·375	53·795	56·260	62·938	57·572	48·855	22·731
February	51·534	52·222	59·043	61·642	57·506	48·477	22·753
March	51·454	52·745	58·375	57·870	58·067	50·241	23·708
April	53·221	53·325	59·207	59·490	58·519	50·250	23·709
May	53·870	53·308	60·880	60·361	58·175	49·915	23·570
June	53·462	53·043	61·290	58·990	56·471	49·034	23·267
July	54·150	52·630	60·654	58·721	54·678	47·519	22·597
August	52·912	52·171	61·606	59·293	54·344	47·163	22·780
September	53·295	52·440	63·078	60·640	53·290	48·680	23·591
October	55·490	53·340	63·471	60·793	50·654	49·385	23·925
November	55·635	55·719	62·792	58·995	49·082	51·716	25·094
December	54·428	54·905	63·365	57·760	49·375	54·971	26·373
Average for the year	53·486	53·304	60·835	59·791	54·811	49·684	23·675

(a) 925 parts fine. From "Engineering and Mining Journal," Feb. 5, 1916.

Important quantities of silver are being produced in Canada both as fine metal and as silver bullion ranging in fineness from 850 to 998·2. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, being derived chiefly from the silver-lead ores of the Province, and finds a market in Canada, the United States, and China.

The annual production of fine silver at Trail, since 1904 has been as follows:—

Year.	Fine ounces.	Year.	Fine ounces.
1904	551,450	1911	1,325,601
1905	1,088,328	1912	1,896,999
1906	1,263,809	1913	2,433,002
1907	1,631,422	1914	2,043,868
1908	1,956,039	1915	2,362,429
1909	2,003,003		
1910	1,798,960	Total	30,354,910

In Ontario ores from the Cobalt district are treated by the Coniagas Reduction Co., Thorold, Ontario, Deloro Mining and Reduction Co., Deloro, Ontario; Metals Chemical Co., Welland, Ontario; Standard Smelting and Refining Co., Chippewa, Ontario.

Silver bullion varying from 850 to 998·2 is produced at these works, other products being white arsenic, metallic nickel and cobalt, sulphate of nickel and cobalt, nickel and cobalt-oxides and mixed oxides. The silver bullion as a rule finds a market in the United States and in England.

Bullion shipped by these Ontario smelters in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1911, 17,753,167 ounces; in 1913, 11,356,707 ounces; in 1914, 9,042,993 ounces, and in 1915, 9,885,989 fine ounces.

The decrease is accounted for by the treatment of the greater part of the high grade ore in the camp itself.

The bullion shipped from the mines and mills in the Cobalt district in 1915, is reported as 9,204,893 fine ounces, as against 10,335,527 fine ounces in 1914.

United States smelters report the receipt of 7,310 tons of ore from the Cobalt district containing 3,580,843 fine ounces of silver, as against 7,206 tons containing 3,966,301 fine ounces in 1914.

Exports and Imports.—The exports of silver during 1915 were 27,672,481 fine ounces valued at $13,812,038, as against exports of 28,020,089 fine ounces, valued at $15,584,813 in 1914, and 37,371,569 fine ounces, valued at $21,441,220 in 1913.

The imports of silver bullion into Canada in 1915 were valued at $337,254, as against imports to the value of $629,279 in 1914 and $840,245 in 1913.

Statistics of silver contained in ore, matte or other form exported from Canada since 1886, and the imports of silver bullion into Canada since 1910 are given in the following tables:—

Exports of Silver in Ore, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1886	$ 25,957	1896	$2,271,959	1906	$ 5,686,444
1887	206,284	1897	3,576,391	1907	9,941,849
1888	219,008	1898	2,902,277	1908	12,403,482
1889	212,163	1899	1,623,905	1909	15,719,909
1890	204,142	1900	2,341,872	1910	15,649,537
1891	225,312	1901	2,026,727	1911	15,807,366
1892	56,688	1901	1,820,058	1912	19,494,416
1893	213,695	1903	1,989,474	1913	21,441,220
1894	359,731	1904	1,904,394	1914	15,584,813
1895	994,354	1905	2,777,218	1915	13,812,038

Imports of Silver Bullion.

Calendar Year.	Value.	Calendar Year.	Value.
1910	$ 975,045	1913	$ 840,245
1911	847,645	1914	629,279
1912	1,100,344	1915	337,254

Quebec.

The small quantity of silver credited to Quebec province for a number of years represents a small silver content of the pyritic ores mined at Eustis and Weedon, in the Eastern Townships. The production in 1915 was 63,450 fine ounces, valued at $31,524, as against 57,737 fine ounces, valued at $31,646 in 1914.

Ontario.

The production of silver in Ontario increased from 17,777 fine ounces in 1903 to 2,451,356 fine ounces in 1905 and reached a maximum of 30,540,754 fine ounces in 1911. The maximum value $17,772,352 was reached in 1912.

In 1915 the production was 22,748,609 fine ounces, valued at $11,302,419, a decrease from 1914 of 9·5 per cent in quantity, and 17·9 per cent in value.

The production included in addition to the production of the Cobalt and adjacent silver camps, 74,787 ounces contained in gold bullion.

The silver ores of the Cobalt district, which in the early days of the camp were all exported for treatment, are being reduced to an increasing extent each year within the camp in cyanide and other mills, with recovery of silver bullion. During 1915, 9,204,893 ounces, or about 41 per cent of the output was thus recovered as bullion in the district, while 9,885,989 ounces, or 43 per cent of the total was recovered by the silver smelters of the Province, so that over 19 millions, or 84 per cent of the Ontario production was recovered in the form of bullion within the Province, leaving a balance of 16 per cent treated in United States smelters.

In 1914 over 41 per cent was recovered as bullion in the district, and 36 per cent by the silver smelters, giving a total of 77 per cent, as recovered in the form of bullion within the Province.

While the greater number of the mining companies, hold unrestricted titles to their properties, several are operated on a royalty basis on mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. A. A. Cole, Mining Engineer to the Commission has in his annual report some interesting statistics from which the following tables and extracts have been drawn:—

Ore Shipments from the Cobalt District for the Years 1904 to 1915.

(In Short Tons).

Mine.	1910.	1911.	1912.	1913.	1914.	1915.	Totals 1904–1915.
Badger	.....	27·10	.....	.....	.....	.....	27·10
Bailey	.....	20·00	41·37	150·35	20·50	.....	388·07
Beaver	140·06	790·81	402·97	292·21	392·07	621·63	2,691·13
Buffalo	1,185·77	1,275·19	1,251·64	66·13	.....	567·33	7,966·96
Casey-Cobalt	48·40	277·74	214·34	401·54	608·30	260·98	1,829·80
Chambers-Ferland	885·92	622·85	501·29	223·78	308·06	326·57	3,610·24
City of Cobalt	329·40	281·30	230·00	105·14	495·71	.....	2,820·02
Comet Cobalt (Drummond)	2,194·41	714·83	458·85	610·06	587·03	634·22	7,997·73
Cobalt Lake	296·80	2,111·32	1,085·22	1,196·33	910·01	.....	5,930·12
Cobalt Townsite	310·99	703·51	1,944·77	2,762·54	1,950·73	.....	8,020·82
Colonial	178·60	114·10	86·48	21·56	.....	.....	456·12
Coniagas	1,261·46	1,813·89	2,119·87	1,620·40	1,217·26	914·25	13,264·30
Crown Reserve	2,814·25	977·32	561·65	791·15	1,067·00	956·14	10,992·38
Foster	.....	102·98	.....	.....	4·50	.....	822·58
†Hargrave	343·68	102·44	17·35	12·96	.....	.....	251·36
Hudson Bay	260·33	898·88	694·55	609·14	647·95	.....	491·92
Imperial Cobalt	.....	.....	.....	.....	.....	.....	5,098·25
Kerr Lake	5,088·78	1,292·58	788·10	931·35	628·42	1,080·32	14·61
King Edward (Watts)	174·12	20·00	.....	87·21	.....	.....	12,178·27
LaRose	5,151·53	3,581·54	3,511·40	3,275·14	1,582·54	1,625·54	776·22
‡Lawson	.....	.....	.....	.....	.....	.....	34,646·04
Lost and Found	.....	.....	65·20	8·80	.....	.....	75·75
Lumsden	.....	.....	.....	20·00	.....	.....	74·00
McKinley-Darragh	2,393·39	3,238·64	2,673·40	2,865·66	2,903·50	1,778·85	20·00
Mg. Corporation of Canada	.....	.....	.....	.....	.....	.....	20,008·28
Nancy Helen	.....	.....	.....	.....	756·77	3,785·16	4,541·93
Nipissing	6,833 81	2,952·20	1,869·27	1,950·22	1,235·07	473·47	347·74
North Cobalt	.....	3·00	.....	.....	.....	.....	30,562·88
Nova Scotia	.....	.....	.....	.....	.....	.....	9·87
O'Brien	608·57	628·44	711·43	703·43	523·21	396·12	778·90
*Penn Canadian	285·62	22·40	126·35	332·18	460·55	685·30	10,081·93
Peterson Lake Leases	.....	.....	.....	.....	122·52	.....	2,516·71
Gould	.....	.....	.....	9·00	50·65	.....	122·52
(Little Nipissing)	313·76	28·45	.....	.....	.....	.....	59·65
(Nova Scotia)	.....	.....	.....	.....	.....	.....	422·50
Seneca Superior	.....	.....	432·97	457·93	398·96	1,008·80	121·15
Provincial	52·05	100·54	22·22	.....	.....	.....	2,298·66
‡Princess	.....	.....	.....	.....	.....	.....	250·65
Red Rock	.....	.....	.....	.....	.....	.....	3·93
Right of Way	981·41	666·00	243·24	146·12	184·16	125·43	45·71
Rochester	28·30	.....	.....	.....	.....	.....	4,881·07
Silver Bar	.....	2·72	.....	20·00	20·00	.....	28·30
Silver Cliff	156·84	92·30	.....	48·05	.....	.....	43·30
Silver Leaf	.....	.....	.....	.....	.....	.....	666·89
Silver Queen	.....	.....	31·25	201·98	105·42	19·69	252·39
Timiskaming	1,119·12	855·60	967·31	406·26	417·56	552·43	2,214·92
Timiskaming-Cobalt	.....	.....	.....	.....	.....	.....	6,169·94
Trethewey	536·64	602·98	579·10	587·54	613·28	124·29	88·45
‡University	.....	.....	.....	.....	.....	.....	6,858·66
Victoria	.....	.....	.....	.....	.....	.....	231·51
Violet	.....	.....	.....	.....	.....	.....	0·47
Waldman	38·81	.....	.....	.....	.....	.....	36·00
Wyandoh	24·15	.....	.....	.....	.....	.....	38·81
	.....	.....	.....	.....	.....	.....	24·15
Total	33,976·97	24,921·71	21,631·79	20,916·16	18,220·71	15,936·52	214,091·44

†The shipment in 1905 was made by the White Silver Mining Co., the former owner of the Hargrave property.

‡Shipments from Lawson, Princess and University, since 1907, included with La Rose.

*Shipments up to the end of 1911 made by the Cobalt Central Mining Company former owner of the Penn Canadian.

Milling in Cobalt during 1915.

Mills and mines.	Tons milled.	Tons of Concentrates produced:			Concentration ratio.
		Jigs.	Tables.	Total.	
Beaver	28,110	136·3	285·5	421·8	67–1
Buffalo	55,697	.....	.....	750·0	74–1
Casey-Cobalt	14,081	9·6	247·5	257 1	55–1
Cobalt Lake	34,719	233·8	681·5	915·3	37–1
Cobalt Reduction	97,132	186·8	1,552·8	1,739 6	56–1
Coniagas	54,767	36·0	374·0	410·0	133–1
McKinley-Darragh	63,568	269·0	1,447·3	1,716·3	37–1
Northern Customs:—					
La Rose	56,472	.....	.....	1,388·0	40–1
Chambers Ferland	6,434	.....	.....	314 9	20–1
Right of Way	5,755	.....	.....	115·8	49–1
Penn Canadian	28,515	139·9	491·2	631·1	45–1
Seneca Superior	8,654	145·6	387·6	533·2	16–1
Timiskaming	26,927	60·1	338·6	387·7	70–1
Trethewey	6,113	7·4	68·9	76·3	80–1
Total	486·924			9,657·1	50–1

Cyanide Mills.	Tons of ore treated.	Ounces of bullion produced.
Dominion Reduction:—		
Campbell & Deyell	10·0	
Comet (Drummond)	18,897·5	
Crown Reserve	27,201·8	
Dominion Reduction	537·9	1,537,336.00
Drummond Fraction	4,595·5	
Glen Lake	2·8	
Kerr Lake	28,001·4	
Nipissing, Low Grade	77,729·6	2,126,310 76
O'Brien	52,883·0	526,272.00
Total	206,858·6	4,189,918.76

Total tons milled by water concentrating mills	486,924
Total tons milled by cyanide mills	206,858
Total tons milled, 1915	693,782
" " 1914	743,531
" " 1913	664,845
" " 1912	455,517
" " 1911	381,871
" " 1910	305,513
" " 1909	126,421
" " 1908	49,424
Grand Total	3,420,904

The total amount of low grade ore treated at the concentrating and cyanide mills, during 1915 was 693,782 tons, as against 743,531 tons in 1914, and 664,845 tons in 1913, a decrease of 6·7 per cent from 1914 while that in 1914 was about 12 per cent higher than the previous year.

At the Buffalo mine, the cyanide plant, which forms part of the low grade mill, treated 10,526 tons of slimes producing 89,696 ounces of silver bullion, as against 9,105 tons producing 67,429 ounces in 1914.

At the high grade mill, 806·5 tons of residues have been re-treated during the year and 30,046 pounds of mercury have been recovered, netting the Company an excellent return. Also 7 tons of raw ore and 459 tons of concentrates were treated, which produced 751.054 ounces of silver bullion.

The Cobalt Reduction mill, of the Mining Corporation of Canada, Ltd., which had extended in 1914, by the addition of a new cyanide plant, treated in 1915, 33,684.21 tons of slimes producing 353,992.19 ounces of silver bullion.

The Nipissing high grade mill treated 1,465 tons of raw ore producing 3,764,394 ounces of silver bullion. The only change made during the year in the high grade ore treatment is an important improvement whereby the large amount of amalgam produced is now re-treated and melted to bullion in one heat in large graphite crucibles, mounted in tilting furnaces.

In the high grade mills at Cobalt, the silver only is recovered, the cobalt, nickel and arsenic being left in the residue for future treatment, or sold for the cobalt content.

In the early days of the Cobalt camp all ores had to be shipped to the United States for treatment. Some Canadian smelters were started which treated high grade ore, and the latest development has been the building of the so-called High Grade Mills at Cobalt, which produce silver bullion by a combination amalgamation—cyanide process.

The 16 per cent of the product still going to the United States consists of some high grade ore along with all the low grade material both ore and concentrates shipped, as the Canadian smelters are not equipped to handle this low material.

Oil Flotation.—The appreciability of concentration by oil flotation to cobalt ores has been demonstrated and a number of companies are now planning oil flotation installations.

The most extensive experimental work [illegible] carried on at the Buffalo mine, where a 50-ton plant was put [illegible] the fall of 1915, using the Callow Pneumatic Process, and [illegible] satisfactory results that a new plant with a daily capacity of 60[illegible] well under way of installation. The process is one which is particularly applicable to the low grade material which makes up the tailing piles of the camp and will make available for treatment immense tonnages of rock which heretofore have been considered of little or no immediate value.

The following notes are taken from the respective company's reports:—

Canadian Mining Corporation, Ltd.

Record of production for 12 months ending December 31, 1915:—

Tons of ore broken	105,139
" " hoisted	127,126
" " treated	132,879
Silver content in ounces	5,030,753.78
" " per ton	37.86
" recovered	4,209,965.12
Percentage of recovery	83.66
Tons of slimes, treated by cyanidation	33,684.21
Silver content of slimes, in ounces	472,423.78
" recovered from slimes, in ounces	353,992.19
Percentage of recovery, in ounces	74.93
Total silver recovered, in ounces	4,563,957.31
" percentage of extraction	90.72
" average silver production per ton of ore, in ounces	34.36

The proportion of silver produced from the high grade and shipping ore, as compared with the total silver produced, was 35·9 per cent.

The total production from the Company's mines since the commencement of operations up to December 31, 1915, was 18,671,599 ounces of silver.

The total cost per ton of ore treated was $10.15 in 1915, as against $9.16 for the 9 months in 1914, and the cost per ounce of silver was 29·57 cents, as against 30·91 cents in 1914.

The ore reserves estimated at December 31, 1915, are reported as 101,135 tons containing nearly 4 million ounces of silver.

Nipissing Mines Company.

Year ending December 31, 1916:—(Nipissing production only).

Total tonnage of ore produced (high grade 833 tons)	77,864
" silver produced in ounces	4,007,391.17
" net value of production	$2,188,278.91

The high grade mill treated 921 tons of Nipissing ore, averaging 2,474 ounces per ton; the low-grade mill treated 77,071 tons of ore averaging 29·62 ounces per ton, and 112 tons of by-products averaging 1,322·34 ounces per ton, with a total recovery for the low grade mill of 2,127,372 ounces, or an extraction of 87·52 per cent.

The production cost per ounce of silver was 19·06 cents, which is about ¾ cent less per ounce than in the previous year.

The ore reserves are reported to contain 9 million ounces of silver and recent developments indicate the possibility of important additions to the reserves.

Coniagas Mines, Ltd.

Year ending October 31, 1915:—

Tons of ore treated	55,437
" high grade concentrates shipped	473·9
Average silver content, in ounces	2,174·6
Tons of low grade slime	133·2
Average silver content, in ounces	233·3
Tons of mine ore shipped	262·2
Average silver content, in ounces	3,519·6
Per cent of possible running time	98·83

Mill heads averaged 23 ounces per ton, sand tailings from the mill 2·89 ounces per ton, and slime tailings 6·36 ounces.

The silver mined and shipped during the year amounted to a little over a million ounces.

The ore in sight contains over 10 million ounces.

Buffalo Mines Limited.

Year ending April 30, 1916:—

Tonnage of ore treated (included 1,005 tons of sand and slime tailings)	38,157
Tonnage treated by wet concentration	30,079
Average silver content, in ounces per ton	19·8
Recovery from wet concentration, in ounces	431,512
Tonnage treated by combination concentration, and oil flotation	8,078
Average silver content, in ounces, per ton	25·46
Recovery from combination concentration and oil flotation, in ounces	197,601
Tonnage of slime from concentrator cyanided	6,340
Average silver content in ounces, per ton	10·54
Recovery from slime, in ounces	55,161
Silver treated at the amalgamation plant and refinery, in ounces	812,020

The total production of bullion from the refinery during the year was 775,253 fine ounces of bullion, and 4·070 ounces of scrap, etc., on hand, making a total of 779,323 fine ounces recovered with residue still to be treated.

The total production of silver for the year amounted to 705,055 ounces.

The ore reserves are 18,000 tons of ore—300,000 tons of tailings, and 3,000 tons of residue from treatment of high grade ore, containing in addition to silver values, cobalt, nickel, and arsenic.

Kerr Lake Mining Company.

Year ending August 31, 1915:—

"The mill treated 23,035 tons of ore, including 2,199 tons taken from the dumps. The grade of the ore was 36·40 ounces per ton, as against 33·83 ounces in 1914.

"The cost of mining was reduced from $5.09 to $4.15 per ton.

"The production amounted to 2,036,962 ounces of silver."

British Columbia.

The silver production of British Columbia based on smelter recoveries in 1915 was 3,565,852 ounces valued at $1,771,658, as against 3,159,897 ounces valued at $1,731,971 in 1914, an increase of nearly 13 per cent in quantity and 2·3 per cent in value.

The chief sources of the silver production in this Province are the silver-lead ores of the East and West Kootenays supplemented by the silver contained in the gold-copper ores of Rossland, the Boundary, and Coast districts.

The leading silver producers, in order of importance were:—

Silver-Lead Mines: Sullivan, Standard, Hewitt, Blue Bell, Rambler, Cariboo, Slocan Star, Surprise, No. One, Monarch, Florence, Cork-Province, Hudson Bay, and Galena Farm.

Copper-Gold Mines: Granby, Hidden Creek, Centre Star, Le Roi, Britannia, Le Roi No. 2, Rocher Deboule, Mother Lode, and Marble Bay.

Gold-Silver Mines: Union, Jewel, Nickel Plate, and Queen.

In the Minister of Mines Report for British Columbia, for 1915, it is stated that: The Slocan district, including the Ainsworth, Slocan, Slocan City and Trout Lake Mining Divisions—produced about 62·9 per cent of the total provincial output of silver this year, and the Fort Steele Mining Division about 14·3 per cent, all from argentiferous galena. The remainder is chiefly derived from the smelting of copper ores carrying silver.

In 1914 the production was reported as: 59 per cent for the Slocan District, and 13·7 per cent for the Fort Steele Division.

The Slocan and Slocan City Divisions alone produced 53·8 per cent of the total output, as against 49·4 per cent in 1914.

The production of silver by districts is shown in the following table:—

Production of Silver in British Columbia by Districts, 1911-1915.*

(Silver Contents of Ores shipped, in fine ounces.)

	1911.	1912.	1913.	1914.	1915.
Cariboo—					
Omineca division	.....	.....	46,298	135,265	79,155
Cassiar	29,976	5,862	4,714	131,509	175,179
Kootenay, East—					
Fort Steel division	330,235	376,918	362,311	492,080	481,258
Other divisions	.....	7,405	4,756	.....	1,188
Kootenay, West—					
Ainsworth division	77,375	301,755	447,015	329,586	299,366
Nelson division	76,774	164,182	129,011	150,268	9,405
Slocan division	793,926	1,657,105	1,841,226	1,775,975	1,812,550
Trail Creek division	88,076	87,530	109,585	136,185	199,584
Revelstoke, Trout Lake, and Lardeau	67,884	43,536	23,397	11,295	46,740
Yale—					
Boundary	326,849	389,341	394,048	347,981	273,795
Yale division	343	.....	461	.....	2,049
Lillooet	.....	.....	295	390	5
Coast and other districts	100,926	98,468	103,034	91,574	66,033
Total	1,892,364	3,132,108	3,465,856	3,602,180	3,366,506

*From the Minister of Mines Reports, British Columbia.

Yukon.

The figures of the silver production of the Yukon given in the following table represent the silver alloyed with the placer gold, together with a certain amount usually small from the lode mines of the district. On an average about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings.

The comparatively large increase in the production for 1915 is due to the shipments of high grade silver-lead ores from the Silver King property in the Mayo area, north of the Stewart river and referred to under "Lead." With the silver recovery from these ores and from the copper ores of the White Horse district, lode mining produced 79 per cent of the total output—leaving 21 per cent as production from the alluvial workings.

The statistics of silver production since 1909 are given in the following table:—

Annual Production of Silver in the Yukon District.

(In fine ounces).

Year.	Placer.		Lode.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1909	45,000	$23,176	.....	.....	45,000	$23,176
1910	50,000	26,743	37,418	$20,013	87,418	46,756
1911	50,300	26,812	62,408	33,206	112,708	60,078
1912	60,302	36,685	20,766	12,633	81,068	49,318
1913	63,522	37,900	24,104	14,412	87,626	52,392
1914	55,744	30,554	37,229	20,405	92,973	50,959
1915	51,706	25,600	196,343	97,552	248,049	123,241

TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. Reports upon it may be found in the Summary Reports of the Geological Survey Branch of the Department of Mines, for 1907, 1908, 1910, 1911, and 1912.

Tin in Black Sands.

During 1913 a sample shipment of one ton of black sand was made from the Atlin district of British Columbia, which is reported to have assayed 6·71 per cent tin. The black sand was obtained from alluvial sluice boxes in this camp. Stream tin has also been found in some of the Yukon placer deposits and a small quantity, recovered in the gold dredging operations, is reported to have been marketed, though no direct returns of production have been obtained.

The imports in 1915 included, tin in blocks, pigs and bars, tin foil, bichloride of tin and strip waste to the amount of 3,920,348 pounds valued at $1,161,334 and tinware and crystals valued at $473,462. There is also a large annual import of tin plate, the quantity in 1915 being 90,329,600 pounds, valued at $2,883,951. The annual imports since 1910 are shown in the following table:—

Annual Imports of Tin.

Calendar Year.	Tin in blocks, pigs and bars.		Tin foil.		(a) Tinware, etc.	Tin crystals.	Bichloride of tin.	
	Pounds.	Value.	Pounds.	Value	Value.	Value.	Pounds.	Value.
1910	3,231,100	$1,058,778	866,751	$114,602	$389,040	$3,903	31,219	$3,846
1911	4,047,500	1,623,670	1,531,877	176,602	461,029	4,370	25,797	3,876
1912	4,894,700	2,134,221	1,316,882	183,707	540,599	6,308	36,045	5,595
1913	5,085,700	2,252,324	1,074,131	188,779	667,158	8,077	19,114	2,422
1914	3,382,700	1,191,466	1,244,628	173,088	650,987	7,759	200	29
1915	2,912,600	1,009,597	1,002,413	151,599	463,610	9,852	.....	.....

(a) Tinware, plain, japanned or lithographed, and all manufactures of tin n.e.s.

Prices.—The price of tin in New York was about 50 cents per pound in January, 1913, but contraction in consumption caused a gradual decline throughout the year.

In January, 1914, the price was about 38 cents per pound. After a slight rise it declined to 30·28 cents in October increasing again to 33·60 cents per pound in December, 1914.

In January, 1915, the price of tin was 34·26 cents, and the market was rather dull until the end of March, when, due to a shortage of supply, tin rose to around 49 cents per pound, 48·426 cents being the average for the month. The minimum price was 33·080 cents in October. The average for the year was 38·590 cents, as against 44·252 cents in 1914.

TUNGSTEN.

No production of tungsten is reported during 1915.

Scheelite was discovered in Halifax county, Nova Scotia, in 1908. Mr. Faribault, of the Geological Survey, visited this deposit again in 1909, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909, pages 228 to 234. During 1910 and 1912 these deposits were developed by the Scheelite Mines, Limited, who constructed a mill and made a shipment of 14 tons of tungsten concentrates—the first shipment from Nova Scotia—carrying 72 per cent tungstic acid.

The occurrence of wolframite has also been noted in association with molybdenite, by Dr. Walker, in New Brunswick, near the confluence of Burnt Hill brook and southwest Miramichi river. The property was tested by Mr. Freeze, of Doaktown, New Brunswick, and Mr. Matthew Lodge, of Moncton, who formed the Acadia Tungsten Mines Company. This Company has done a little development.

Prices.—"The market for tungsten ore during the first quarter of 1915 was very poor, $6 to $9 per unit. During April and May the Allies placed enormous orders for war requirements; the price reached $10.00 per unit and continued rising by leaps and bounds.

"Large quantities of tungsten ore were booked in December at $44.00 per unit and also at $50.00 per unit. Ammunition buyers have paid as much as $62.50 per unit, or even more.

"The value of tungsten metal advanced from 60 cents per pound to $7.00 per pound during the year. Tool steel that used to be worth about 70 cents per pound is eagerly bought at $3.00 per pound."*

*From "Engineering and Mining Journal," p. 144, January 15, 1916.

ZINC.

The production of zinc ore in Canada in 1915, as obtained by direct returns from producers, was 14,895 tons, valued at $554,938, as against 10,893 tons, valued at $262,563 in 1914. The zinc content of these shipments was returned as 12,231,439 pounds, which, if valued at the average New York price of spelter during the year—13·230 cents, would be worth $1,618,219, as against 9,101,460 pounds, valued at 5·213 cents per pound, or with a total value of $474,459 in 1914.

The greater part of this production is from British Columbia and the ore shipped contains also a varying silver content, for which payment is made by the smelters, and without which, on account of the import duty to the United States and the long rail haul, it would not in many cases pay to ship. The Slocan mining division produced about ⅓ of the total output—Nelson about ⅙, and the balance came mostly from the Ainsworth and Fort Steele divisions.

In Quebec, the property at Notre Dame des Anges, Portneuf, which is being operated by the Weedon Mining Company, shipped several hundred tons of ore.

Statistics of the production of zinc since 1898 are given in the following table:—

Annual Production of Zinc.

Year.	Zinc ore shipped.		Metallic zinc in ore shipped.	
	Tons.	Spot value.	Pounds.	Final value.
1898	1,162	$11,000	788,000	$ 36,011
1899	865	18,165	814,000	46,805
1900	261	4,810	212,000	9,342
1901				
1902	158	1,659	142,200	6,882
1903	1,000	10,500	900,000	48,660
1904	597	3,700	477,568	24,256
1905	9,413	139,200	*	*
1906	1,154	23,800	*	*
1907	1,573	49,100	*	*
1908	452	3,215	*	*
1909 (a)	18,371	242,699	16,468,204	906,245
1910	5,063	120,003	4,361,712	240,766
1911	2,590	101,072	2,346,849	135,132
1912	6,415	215,149	5,354,700	371,777
1913	7,889	186,827	7,069,800	399,302
1914	10,893	262,563	9,101,460	474,459
1915	14,895	554,938	12,231,439	1,618,219

*Figures not available.
(a) Includes 7,424 tons shipped late in 1908.

During 1913 the new United States customs tariff came into effect considerably reducing the duties payable on Canadian ores, the new items affecting Canadian shipments being:—

Zinc ores containing 25 per cent or more zinc: 10 per cent on zinc contained therein.

Lead bearing ore: ¾ cent per pound on lead contained therein.

Although not paid for by the United States smelters, the lead in ore is considered as dutiable and as there is often a small lead content in the zinc ore or concentrates shipped, the lead duty applies. The result of the decreased duties has been a considerable increase in zinc shipments.

There is also a duty of 15 per cent on metallic zinc exported to the United States, and at present an import duty of 7½ per cent on zinc and other materials imported into Canada from the United States.

The price of spelter in New York varied between a minimum of 5¾ cents per pound in January and a maximum of 25 to 27 cents in June, the price at the close of the year being from 15½ to 16¾ cents and the average for the year 13·230 cents per pound.

The price of high-grade spelter rose from 10 cents at the beginning of the year to over 40 cents in midsummer and was maintained fairly strongly through the balance of the year at from 35 to 40 cents.

Average Price of Spelter in Cents per Pound at New York.*

Month.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January	6·190	6·487	6·732	4·513	5·141	6·101	5·452	6·442	6·931	5·262	6·386
February	6·139	6·075	6·814	4·785	4·889	5·369	5·518	6·499	6·239	5·377	8·436
March	6·067	6·209	6·837	4·665	4·757	5·637	5·563	6·626	6·078	5·250	8·541
April	5·817	6·087	6·687	4·643	4·965	5·439	5·399	6·633	5·641	5·113	10·012
May	5·434	5·997	6·441	4·608	5·124	5·191	5·348	6·679	5·406	5·074	14·781
June	5·190	6·096	6·419	4·543	5·402	5·128	5·520	6·877	5·124	5·000	21·208
July	5·396	6·006	6·072	4·485	5·402	5·152	5·695	7·116	5·278	4·920	19·026
August	5·706	6·027	5·701	4·702	5·729	5·279	5·953	7·028	5·658	5·568	12·781
September	5·887	6·216	5·236	4·769	5·796	5·514	5·869	7·454	5·694	5·380	13·440
October	6·087	6·222	5·430	4·801	6·199	5·628	6·102	7·426	5·340	4·909	12·800
November	6·145	6·375	4·925	5·059	6·381	3·976	6·380	7·371	5·229	5·112	15·962
December	6·522	6·593	4·254	5·137	6·249	5·624	6·301	7·162	5·154	5·592	15·391
Year	5·822	6·198	5·962	4·726	5·503	5·520	5·758	6·943	5·648	5·213	13·230

*From the Engineering and Mining Journal, N. Y., Feb. 5, 1916.

Average Prices of Spelter, Ordinary Brands, in London.*

(In pounds per ton.)

Month.	1906.			1907.			1908.			1909			1910.		
January	28	8	2	27	7	1	20	6	3	21	6	3	23	4	3
February	26	2	4	26	1	5	21	0	7	21	8	9	23	3	1
March	24	15	3	26	4	8	21	1	5	21	8	8	23	3	7
April	25	19	3	25	17	5	21	6	1	21	10	1	22	9	11
May	27	0	2	25	14	2	20	2	10	21	19	1	22	1	1
June	27	9	9	24	10	2	19	2	2	21	19	11	22	3	2
July	26	15	11	23	18	11	18	14	1	21	18	9	22	5	6
August	27	0	5	22	1	7	19	6	9	22	0	3	22	14	0
September	27	12	5	21	0	11	19	10	3	22	17	1	23	2	7
October	27	18	10	21	12	11	19	15	1	23	3	4	23	16	6
November	27	15	1	21	8	4	20	17	1	23	2	1	24	1	9
December	27	19	3	20	3	3	20	19	2	23	1	3	23	17	7
Year	27	1	5	23	16	9	20	3	6	22	2	11	23	0	0

Month.	1911.			1912.			1913.			1914.			1915.		
January	23	16	7	26	9	11	25	19	1	21	6	6	30	16	1
February	23	3	10	26	6	5	25	4	3	21	7	6	39	16	4
March	22	19	2	25	19	11	24	11	4	21	7	7	44	2	7
April	23	13	8	25	8	11	25	2	4	21	10	2	49	17	9
May	24	6	1	25	11	2	26	10	4	21	5	9	67	19	0
June	24	9	7	25	11	11	21	19	10	21	6	0	100	12	3
July	24	13	10	25	13	1	20	11	2	21	6	7	97	5	0
August	26	11	2	26	1	2	20	14	0	29	0	9	67	15	9
September	27	12	7	26	17	0	21	3	10	25	14	0	67	17	9
October	27	4	10	27	5	10	20	13	9	23	13	6	66	10	11
November	26	13	2	26	14	3	20	14	4	24	14	10	85	6	4
December	26	13	7	26	0	4	21	6	8	27	6	10	82	4	1
Year	25	3	2	26	3	3	22	14	3	23	6	8	66	13	8

*From the annual publication of the "Metal Information Bureau," London, E.C

The imports of zinc, which may be taken as an index of consumption, show a fairly steady increase and amounted in 1915 to 15,919,500 pounds of zinc in blocks or pigs, spelter and tubing, valued at $2,010,602; 12,251,257 pounds of zinc white, zinc dust, zinc sulphate and chloride of zinc, valued at $743,045; and manufactures of zinc, valued at $21,711.

The total value of the imports in 1915, of brass, which alloy contains about 30 per cent zinc, was $3,177,942 and was made up as follows: brass in blocks, pigs or ingots 1,677,800 pounds, valued at $226,499; "old and scrap," tubing and plain wire, 2,133,148 pounds, valued at $[illegible]; brass in bars and rods and strips, sheets or plates, valued at $[illegible]; brass caps for electric batteries, caps for shells, wire cloth, nails and tacks and handpumps, valued at $606,484; and other manufactures of brass, valued at $1,406,676.

The imports of zinc during 1914 were valued at $1,174,297 and included 14,006,300 pounds of zinc in blocks, pigs, spelter and tubing, valued at $740,816; 10,160,221 pounds of zinc white, zinc dust, zinc sulphate and chloride of zinc, valued at $433,481; and manufactures of zinc, valued at $36,355.

The imports of brass during 1914 were valued at $2,858,088 and included, brass in blocks, pigs or ingots 1,010,600 pounds, valued at $126,357; "old and scrap," tubing and plain wire 3,368,880 pounds, valued at $525,005; brass in bars and rods (free), 1,747,700 pounds valued at $285,656; and also brass in bars and rods and strips, sheets or plates, valued at $205,560 brass caps for electric batteries, caps for shells, wire cloth, nails and tacks, and handpumps, valued at $269,612; and other manufactures of brass, valued at $1,445,898.

The estimated zinc contents of zinc products and of brass imported during the past two years is shown in the following table according to which the consumption of zinc during 1915 amounted to at least 13,389 tons together with the zinc contents of manufactures of zinc and of brass which would probably not exceed 1,000 tons.

The zinc imports during 1912 amounted to over 16,000 tons of metal and according to the Customs records, exceed the imports during 1914 and 1915.

Summary of Imports of Zinc and Zinc Products in 1914 and 1915.

Imports of Zinc.

Zinc and Zinc products.	1914. Product in pounds.	1914. Value of products.	1914. Zinc content in pounds.	1915. Product in pounds.	1915. Value of product.	1915. Zinc content in pounds.
Zinc, in blocks, pigs and sheets	3,160,900	$ 189,785	3,160,900	1,653,700	$ 226,104	1,653,700
" as spelter	10,845,400	551,031	10,845,400	14,265,700	1,784,471	14,265,700
" seamless tubing				100	27	100
" white	9,445,397	389,706	(80%) 7,556,318	11,368,569	656,132	(80%) 9,094,855
" dust	362,109	34,295	(90%) 325,898	503,143	70,823	(90%) 452,829
" sulphate and chloride of	352,715	9,390	(44%) 155,195	379,545	16,090	(44%) 167,000
Total	24,166,521	$1,174,297	22,043,711 (11,021·8 tons)	28,170,757	$2,775,331	25,634,184 (12,817·1 tons).
" as manufacture of		$36,355			$21·711	
Brass in blocks, pigs & ingots	1,010,600	$ 126,357	(30%) 303,180	1,677,800	$226,499	(30%) 503,340
" old and scrap	1,407,900	150,346	" 422,370	311,900	41,971	" 93,570
" tubing	1,590,573	314,675	" 477,172	1,381,482	349,588	" 414,445
" plain wire	370,407	59,984	" 111,122	439,766	95,952	" 131,930
" bars and rods (free)	1,747,700	285,656	" 524,310			
Total	6,127,180	$937,018	1,838,154 (919·1 tons).	3,810,948	$714,110	1,143,285 (571·6 tons).
Brass, bars and rods		$ 94,827			$215,782	
" strips, sheets or plates		110,733			234,590	
" wire cloth n.o.p.		120,614			147,464	
" cups for manuf. of shells		124,622			435,161	
" caps for electric batteries		5,684			5,367	
" hand-pumps		11,956			10,930	
" nails, tacks, etc.		6,736			7,562	
" other manufactures n.o.p.		1,445,898			1,406,676	
Total		$1,921,070			$2,463,532	

Imports of Zinc.

Fiscal Year.	In blocks, pigs and sheets.		As spelter.		As manufactures of zinc.	Seamless tubing.	
	Cwt.	Value.	Cwt.	Value.	Value.	Pounds.	Value.
1880	13,805	$67,881	1,073	$ 5,301	$8,327		
1881	20,920	94,015	2,904	12,276	20,178		
1882	15,021	76,631	1,654	7,779	15,526		
1883	22,765	94,799	1,274	5,196	22,599		
1884	18,945	77,373	2,239	10,417	11,952		
1885	20,954	70,598	3,325	10,[illegible]8	9,459		
1886	23,146	85,599	5,432	18,2[illegible]	7,348		
1887	26,142	98,557	6,908	25,007	6,561		
1888	16,407	65,827	7,772	29,76[illegible]	7,402		
1889	19,782	83,935	8,750	37,403	7,233		
1890	18,236	92,580	14,570	71,1[illegible]	6,472		
1891	17,984	105,023	6,249	31,459	7,178		
1892	21,881	127,302	13,[illegible]8	62,590	7,563		
1893	26,446	124,360	10,721	49,822	7,464		
1894	20,774	90,680	8,423	35,615	6,193		
1895	15,061	63,373	9,249	30,245	5,561		
1896	20,223	80,784	10,897	40,548	6,290		
1897	11,946	57,754	8,342	32,826	5,145		
1898	35,148	112,785	2,794	13,561	10,503		
1899	18,785	107,477	5,450	29,687	14,661		
1900	28,748	156,167	5,836	29,416	11,475		
1901	20,527	103,457	14,621	58,283	6,882		
1902	34,871	141,560	18,356	80,737	6,683		
1903	26,646	142,827	23,159	110,817	9,754		
1904	25,553	138,057	33,952	164,751	12,682		
1905	25,141	141,514	37,941	206,244	11,912		
1906	24,462	158,438	50,137	290,686	12,917		
Calendar Year.							
1907	30,130	198,570	58,430	348,810	21,812	670	$ 53
1908	24,273	130,689	54,780	254,225	14,577		
1909	35,283	199,016	120,615	592,148	16,073		
1910	31,660	191,051	109,084	561,170	21,829		
1911	33,678	206,859	116,996	654,097	30,862		
1912	100,095	617,836	117,845	686,585	46,336		
1913	47,226	291,368	126,051	661,207	54,898		
1914	31,600	189,785	108,454	551,031	36,355		
1915	16,537	226,104	142,657	1,784,471	21,711	100	27

Imports of Zinc White, Zinc Dust, and Zinc Sulphate and Chloride.

Calendar Year.	Zinc white.		Zinc dust.		Zinc, sulphate and chloride of.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1910	8,496,390	$312,779	97,461	$ 4,859	237,466	$ 6,470
1911	8,537,498	314,194	86,242	5,718	414,500	15,930
1912	10,505,944	425,714	308,239	18,914	941,780	29,104
1913	12,682,126	525,643	412,294	26,403	634,634	17,424
1914	9,445,397	389,796	362,109	34,295	352,715	9,390
1915	11,368,569	656,132	503,143	70,823	379,545	16,090

British Columbia.—The annual production of zinc in British Columbia, by districts, showing zinc contents of ores shipped during the past five years, as recorded by the Provincial Bureau of Mines, is presented in the next table.

According to the Provincial Mineralogist,—"The total quantity of zinc produced in 1915 was 12,982,440 pounds of which 8,684,572 pounds came

from the Slocan District; 3,127,209 pounds from Nelson Division; 678,940 pounds from Ainsworth Division, and 491,719 pounds from East Kootenay.

"The largest producer in the Province was the Standard, in Slocan Division, which is credited with 3,778,857 pounds, followed by the H.B., in Nelson Division, with 2,387,514 pounds, and the Silverton Mines, Slocan, with 1,385,859 pounds; while the Zincton mine, in Nelson District, produced 739,695 pounds; the J. L. Retallack Mines, in Ainsworth 576,000 pounds; the Lucky Jim in Slocan 788,158 pounds; and the Rambler-Carriboo 540,660 pounds."

It is also pointed out that the supply of ore brought out by the extraordinary high prices quoted for spelter "was so great that such smelters as were equipped to handle it only bought at a very large margin of profit so that the zinc miner did not make as great profits as the increased market price of the metal would seem to indicate."

Production of Zinc in British Columbia by Districts, 1911-1915.

(Contents of ore shipped in pounds).

	1911.	1912.	1913.	1914.	1915.
Kootenay, East—					
Fort Steele division					180,000
Other divisions		142,643			311,719
Kootenay, West—					
Ainsworth division			150,680	280,000	678,940
Nelson division				332,003	3,127,209
Slocan division	2,634,544	5,215,637	6,608,088	7,254,464	8,684,572
	2,634,544	5,358,280	6,758,768	7,866,467	12,982,440

*From the Minister of Mines Reports, British Columbia.

World's Production of Spelter in Short Tons.*

Country.	1908.	1909.	1910.	1911.	1912.	1913.
Australia	1,198		560	1,904	2,531	4,105
Austria and Italy	14,063	13,931	14,666	18,602	21,609	23,928
Belgium	181,851	184,194	190,233	215,050	220,678	217,928
France and Spain	61,512	61,859	65,191	79,791	79,543	78,289
Germany	239,062	242,594	251,046	276,008	298,794	312,075
Great Britain	60,029	65,422	69,531	73,803	63,086	65,197
Holland	19,017	21,548	23,121	25,059	26,380	26,811
Poland	9,740	8,758	9,514	10,952	9,659	8,389
United States	210,424	255,760	269,184	286,526	338,806	346,676
Norway				7,363	8,959	10,237
Total	796,896	854,066	893,046	986,058	1,070,045	1,093,635

*Mineral Resources of the United States.

World's Consumption of Spelter in Short Tons.*

Country.	1908.	1909.	1910.	1911.	1912.	1913.
Austria-Hungary	35,935	36,155	37,258	47,950	51,588	44,533
Belgium	74,956	71,209	84,326	81,240	85,098	84,216
France	85,869	73,744	62,059	90,389	90,389	89,286
Germany	198,634	207,343	203,374	241,734	248,899	255,734
Great Britain	152,669	171,408	195,989	193,674	204,146	214,508
Holland	4,189	4,409	4,409	4,409	4,409	4,409
Italy	9,259	9,039	8,929	11,133	11,795	12,015
Russia	19,621	20,282	27,447	31,856	30,754	36,707
Spain	5,512	4,960	4,630	5,291	5,181	6,503
United States	214,167	270,730	245,884	280,059	340,372	295,370
Other countries	11,023	9,921	13,669	19,621	21,715	23,038
Total	811,834	879,200	887,974	1,007,356	1,094,346	1,066,319

*Mineral Resources of the United States.

There are now in Canada three companies constructing, or operating, electrolytic plants, viz: The Electro Zinc Company at Welland, which uses the Watt's process; the French Complex Ore Reduction Company at Nelson, using the French process; and the Consolidated Mining and Smelting Co. of Canada, Ltd., at Trail, which Company has erected a large plant and is increasing its capacity so as to treat, it is reported, about 60 tons per day.

In December of 1915 these operations with the possible exception of Trail, were still in the experimental stages of development. The Welland plant was designed to recover refined zinc from zinc oxide although it was ultimately intended to extend the operations to include the reduction of zinc ores from Notre Dame des Anges, in Quebec.

The French Complex Ore Reduction Company conducted a further demonstration of the "French" process at the Standard Silver Lead Mining Company's mill at Silverton. Satisfactory results were claimed although operations were discontinued.

The "Daily Colonist" of Victoria, on Sept. 12, 1915, reported: "that the Provincial Government had decided to extend a measure of financial assistance to the French Complex Ore Reduction Company, so that a demonstration plant of some practical usefulness may be established at Nelson; also to lease to the Company, on favorable terms the old Government plant.

"The Government was extending a measure of aid to the Company in view of the possibility of encouraging the greater production of zinc in British Columbia, a matter of vital concern to the Imperial Government, in view of the use of zinc in the manufacture of munitions of war."

During 1916 a Government Bill, was introduced in the Provincial Legislature, to guarantee bonds of the French Complex Ore Reduction Company, to the amount of $40,000.

At Trail "considerable experimental work was carried on during the year in the production of electrolytic zinc, and spelter of a good grade has been produced at the rate of about one-half ton per day from zinc contained in the Sullivan ore. The results have been promising enough to warrant the building of a larger plant, and, on account of exceptional circumstances, a plant of twenty-five to thirty-five tons capacity of spelter per day has been designed and is now being erected. It is hoped that this will be in operation early in the year.

"The operation of this plant should make available a very large amount of complex ore at the Sullivan mine, and the extraction of this ore will probably lead to the development of further bodies of lead ore in the same mine."

The Trail plant started regular commercial operations early in 1916 and in July was reported to be producing 20 tons per day.

In August, 1915, the Dominion Government announced, as follows, its intention to provide a measure of assistance toward stimulating the establishment of a zinc smelting industry in Canada. "A Committee of the Government under the chairmanship of the Minister of Finance, after full discussion with members of the Shell Committee, has satisfactorily solved the problem of ensuring at reasonable prices a Canadian supply of zinc suitable for use in the production of brass for the making of quick-firing cartridge cases for shells. Before the outbreak of war this quality of zinc sold at about eight cents per pound. Since that time the price has steadily risen as high as forty cents and grave fears were entertained that the supply might be entirely cut off. At present the sources of supply are outside of Canada. The Shell Committee, representing the British Government in the purchase of shells in Canada, regarded it as absolutely necessary that there should be supplies of this zinc within Canada. Canadian producers were unwilling to go to the large expense of installing refineries unless insured against the fall in zinc prices which is inevitable after the close of the war. After considerable negotiation the Government decided to offer a limited bounty for the production in Canada of zinc."

An Act to provide for the payment of bounties on zinc produced from zinc ores mined in Canada was passed by the House of Commons of Canada, May 3rd, 1916, and reads as follows:—

"An Act to provide for the payment of Bounties on Zinc produced from Zinc Ores mined in Canada.

"His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

"1. This Act may be cited as The Zinc Bounties Act, 1916.

"2. Whenever it appears to the satisfaction of the Minister of Trade and Commerce who is charged with the administration of this Act, that the standard price of zinc or spelter in cakes, stocks or pigs, in London, England, is less than £36 19s. 3d. sterling, per ton of two thousand two hundred

and forty pounds, the Governor in Council may authorize the payment out of the Consolidated Revenue Fund of a bounty on zinc or spelter, containing not more than two per cent of impurities, produced in Canada, at the time the price is as hereinbefore stated, from zinc ores mined in Canada. Such bounty shall be equal to the difference between such standard price per ton and £36 19s. 3d. per ton, but shall in no case exceed two cents per pound, and in no event shall any bounty be paid when the price received for such zinc and spelter by the producer is eight cents or more per pound."

"3. No bounty shall be payable under this Act on zinc or spelter produced during the continuation of the war, and in no event shall bounty be payable on zinc or spelter produced after the thirty-first day of July, one thousand nine hundred and seventeen."

"4. The total amount payable under the provisions of this Act shall not exceed the sum of $400,000."

"5. The Governor in Council may make regulations for carrying out the provisions of this Act."

Electrolytic Zinc Plants in Canada.

Company.	Location of plant.	Remarks.
Consolidated Mining and Smelting Co. of Canada, Ltd	Trail, B.C.	Capacity of plant, 35 tons of refined zinc per day being increased to 60 tons per day.
Electro Zinc Company, Ltd	Welland, Ont.	Experimental in 1915. Small plant for recovery of zinc from zinc oxide.
French Complex Ore Reduction Company	Nelson, B.C.	Experimental. Small demonstrations at Nelson, B.C.

Electrolytic Zinc Plants in the United States.*

Company.	Location of plant.	Daily spelter capacity.	Remarks.
American Smelting and Refining Co.	Omaha, Nebr.	Experimental.	Operated in 1915.
Anaconda Copper Mg. Co.	Garfield, Utah.	10 tons.	Planned.
	Anaconda, Mont.	25 tons.	Under construction; 10 tons operated in 1915.
Bully Hill Copper Co.	Great Falls, Mont.	100 tons.	Under construction.
	Bully Hill, Cal.	Experimental.	Operated in 1915.
Daly-Judge Mining Co.	Park City, Utah.	10 tons.	Under construction.
Electrolytic Zinc Co.	Baltimore, Md.	15 tons.	"
		10 tons.	Under construction; 2½ tons now in operation.
Mammoth Copper Mg. Co.	Kennett, Cal.	Experimental.	Operated in 1915.
Northwestern Metals Co.	Helena, Mont.	Ore capacity 100 tons.	Malm process; not operated in 1915.
Reed Zinc Co.	Palo Alto, Cal.	Experimental.	Operated in 1914–15.
River Smelting and Refining Co.	Keokuk, Iowa.	"	Operated in 1915.
Western Metals Co.	Georgetown, Colo.	Ore capacity 100 tons.	Malm process; under construction.

*As published by the United States Geological Survey, April 4, 1916.

Active Zinc Smelters in the United States, and Capacity in 1916, by Companies and States.*

Company.	Location.	Acid Plants.	Retorts at close of 1915.	Retorts June 30 1916.	Additional retorts contemplated or under construction.
Fort Smith Spelter Co.	Fort Smith, Ark.			2,560	
Arkansas Zinc Co.	Van Buren, "			2,400	
United States Zinc Co.	Pueblo, Colo.		2,208	1,944	
American Zinc Co. of Illinois	Hillsboro, Ill.	A	4,000	4,864	
Collinsville Zinc Sm. Co.	Collinsville, "		1,792	2,304	
Granby Mg. & Sm. Co.	E. St. Louis "	A	3,220	3,220	2,400
Hegeler Zinc Co	Danville, "	A	3,600	5,400	
Illinois Zinc Co.	Peru, "	A	4,640	4,640	800
Matthiesson & Hegeler Zinc Co.	La Salle, "	A	6,168	6,168	
Missouri Zinc Co.	Beckemeyer, "		352	352	
Mineral Pt. Zinc Co.	Depue, "	A	9,068	9,068	
National Zinc Co.	Springfield, "	A	3,200	4,480	
Robt. Lanyon Z. & Acid Co.	Hillsboro, "	A	1,840	3,200	
Sandoval Zinc Co.	Sandoval, "		672	672	
American Spelter Co.	Pittsburgh, Kan.		896	992	
American Zinc, Lead & Smelting Co.	Caney, "		6,080	6,080	
" " "	Dearing, "		4,480	4,480	
Chanute Spelter Co.	Chanute, "		1,280	1,280	
Cherokee Smelting Co.	Bruce, "		896	896	
Edgar Zinc Co.	Cherryvale, "		4,800	4,800	
Granby Mg. & Sm. Co.	Neodesha, "		3,760	3,760	
Iola Zinc Co.	Concreto, "		660	1,320	
Joplin Ore & Spelter Corporation	Pittsburgh, "		1,444	1,792	
Lanyon Smelting Co.	" "		448	448	
Owen Zinc Co.	Caney, "		1,280	1,280	640
Pittsburg Zinc Co.	Pittsburgh, "		910	910	
Prime Western Spelter Company	Gas, "	A	4,868	4,868	
U.S. Smelting Co.	Altoona, "		3,960	4,600	
" "	Iola, "		3,440	3,440	
" "	La Harpe, "		1,924	1,924	
Weir Smelting Co.	Weir, "				448
Edgar Zinc Co.	St. Louis, Miss.		2,000	2,000	
Miss. Zinc Sm. Co.	Rich Hill, "			448	
Nevada Smelting Co.	Nevada, "		672	672	
Bartlesville Zinc Co.	Bartlesville, Okla.		5,184	6,336	
" "	Blackwell, "			1,600	4,800
" "	Collinsville, "		10,752	13,440	
Bartlesville Zinc Co. (Lanyon-Starr Plant)	Bartlesville, "		3,456	3,456	
Eagle-Picher Lead Co.	Henryetta, "				4,000
Henryetta Spelter Co.	" "			3,000	
J. B. Kirk Gas & Sm. Co.	Checotah, "			2,560	2,560
Kusa Spelter Co.	Kusa, "		3,720	3,720	
La Harpe Spelter Co.	" "			4,000	
National Zinc Co.	Bartlesville, "		4,970	4,970	
Oklahoma Spelter Co.	Kusa, "			1,600	
Quinton Spelter Co.	Quinton, "				1,340
Tulsa Fuel & Mfg. Co.	Collinsville, "		6,232	6,232	
U.S. Zinc Co.	Sand Springs, "		5,680	8,000	
American Steel & Wire Company	Donora, Penn.	A	3,648	9,120	
American Zinc & Chemical Co.	Langeloth, "	A	3,648	6,384	912
N. J. Zinc Co. (of Pennsylvania)	Palmerton, "		6,720	6,960	
Clarksburg Zinc Co.	Clarksburg, W. Va.		3,648	3,648	
Grasselli Chemical Co.	" "	A	5,760	5,760	
" "	Meadowbrook, "	A	8,592	8,592	
United Zinc Smelting Corporation	Moundsville, "	A			6,912
Total, for all States			156,568	196,640	24,812
	Plants with special retorts:—				
	Michael Hayman & Co., Buffalo, N.Y.		12	12	
	Trenton Sm. & Refining Co., Trenton, N.J.		96	60	
	Wm. Cramp & Sons S. & Engine Bldg. Co., Philadelphia, Pa.		32	32	

*United States Geological Survey, Press Bulletin No. 285, August, 1916.